Univerzita Karlova v Praze, Filozofická fakulta, Katedra Psychologie

DIPLOMOVÁ PRÁCE

Making „Exit" Decisions

Monitoring and Adapting Intuitive Judgment Processes involved

Výstupní rozhodnutí

Sledování a přizpůsobování procesů intuitivního usuzování

Autor: Nina Bakošová
Vedoucí: Doc. PhDr. Ing. Karel Riegel, CSc.

Prohlašuji, že jsem diplomovou práci vypracovala samostatně a že jsem uvedla všechny použité prameny a literaturu.

V Praze, dne 9. srpna 2007 .....

Abstrakt

Cílem diplomové práce bylo prozkoumat výstupní rozhodování (tj. rozhodnutí opustit jakoukoliv aktivitu vyžadující předchozí peněžní, časové nebo jiné investice) a jeho možná zlepšení, a to nejenom v oblasti podnikání, ale především v osobním rozhodování. Stěžejní byla aplikace poznatků dvou teoretických přístupů: *Prospekt teorie* navržené Kahnemanem a Tverskym a modelu *intuitivního usuzování*. Využitím poznatků pramenících z těchto teoretických základů byly identifikovány dva fenomény charakteristické pro výstupní rozhodování, které byly také středem zájmu příslušného výzkumu. Jmenovitě se jedná o (opačný) efekt utopených nákladů a následnou (de-) eskalaci závazku.

Výzkum sestával ze dvou částí. První byla zaměřena na vývoj nového výzkumného scénáře s důrazem na osobní charakter výstupního rozhodování. Druhá zkoumala reakci na čtyři úrovně utopených nákladů (peněžních nebo časových výdajů). Dle výsledků Fáze B pilotní studie nový scénář úspěšně navodil opačný efekt utopených nákladů. Scénář byl dál upraven pro účely hlavní studie, která však přinesla neurčité výsledky. Peněžní utopené náklady nevyvolaly žádný z očekávaných efektů, zatímco časové navodily efekt opačný a na to navazující de-eskalaci závazku, ač nekoherentní napříč úrovněmi utopených nákladů.

Autorka se domnívá, že tyto výsledky odhalily existenci důležitých faktorů hrajících roli v osobních výstupních rozhodnutích, které dosud nebyly zahrnuty v teoretickém modelu (např. povaha nákladů ovlivnila úroveň navozeného závazku vůči prvotnímu rozhodnutí apod.). Podle autorky je další výzkum k doladění této výzkumné metody podmínkou k tomu, aby mohla být plně využita, ale zároveň má za to, že tento výzkum již prokázal účelnost nového scenáře při zkoumání a hledání metod optimalizace osobních výstupních rozhodnutí.

Klíčová slova

Rozhodování v podmínkách nejistoty, výstupní rozhodnutí, racionalita, Teorie očekávaného užitku, Prospekt teorie, vyhledávání/vyhýbání se riziku, intuitivní usuzování, heuristiky a předsudky, optimalita, efekt utopených nákladů, efekt eskalace závazku, peněžní investice, časové investice

Abstract

The purpose of this thesis is to examine exit decision-making (e.g. decision to cease a venture, project or any other kind of activity, which required previous monetary, time or other investment) as well as to explore possible enhancements of exit decision-making not only in business context but also in personal decisions. Two theoretical approaches were applied: *Prospect theory* by Kahneman and Tversky and *Intuitive judgment approach*. Implications stemming from these theoretical models were employed and two phenomena characteristic of exit decision-making specified. Namely, it was (reverse) sunk cost fallacy and resulting (de-)escalation of commitment, which were also explored empirically.

Research consisted of two parts. First developed a new research scenario aiming at personal exit decision-making. Second explored the reaction to four levels of sunk costs (monetary or time expenses). As Phase B of Pilot study showed, new scenario proved managed to elicit reverse sunk costs effect. Further changes were made to the scenario for the purposes of Main study, which resulted in equivocal findings. Monetary sunk costs did not elicit any expected effect, time sunk costs induced an incoherent reverse sunk cost effect and respective de-escalation of commitment.

Author believes these results revealed that important factors not accounted for in theoretical model are at play in personal exit decision-making (for example nature of investment influenced level of induced commitment etc.) Author suggests further research is necessary to fine-tune the method and capitalize on it fully, but believes it has already shown useful in pursuance of personal exit decisions as well as in search for methods of optimalization of exit decision-making.

Keywords

Decision-making under uncertainty, exit decisions, rationality, Expected utility theory, Prospect theory, risk-seeking/aversion, intuitive judgments, heuristics and biases, optimality, sunk cost fallacy, escalation of commitment, monetary investment, time investment

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Contents

I. Theoretical part

1 Introduction

Decision-making is an ordinary, daily situation, depending on its complexity requiring different effort levels and strategies from decision-maker. Consider the following (source: www.dilbert.com, by Scott Adams, published on July 19th 2006):

As underlined by the above comic strip, decision-making is extensively common, but also complex, using various strategies and taking on various forms. Such everydayness makes decision-making extremely appealing for researchers, psychologists as well as behavioral economists. On the other hand, empirical findings quite often pinpoint weaknesses of existing theoretical models, again pushing the limits of theory. However, study of decision-making, the author believes, necessarily fails to create an exhaustively explanatory model of individual decision-making under uncertainty. This inability, according to the author, stems from individual freedom of choice, e.g. conduct that is not fully accountable for by outside reasons, or as Sokol puts it *„conduct, that is unpredictable and unrepeatable from outside perspective"* (Sokol, 1996, p.77-8).

For the purposes of scientific investigation, freedom of choice is often at least partially neglected. Similarly theoretical models of decision-making simplify

the decision-maker. In this thesis, the author will be looking on key models of decision-making under uncertainty, specifically in exit decisional situations, suggested by economy and psychology and their newest advancements. Nevertheless, the author would like to note, that, since she believes the attempt to predict free choice is in the end in vain, all presented models should be perceived as more or less successful simplifications.

As follows, Theoretical part of this thesis firstly defines decision-making under uncertainty and distinguishes the processes of problem-solving and judgment. Chapter 3 is concerned with historical perspective on the study of decision-making, mentioning main developments in psychology, economy, statistics and probability theory. The core of this chapter lies in treatise of three key models of individual decision-making, which are of most concern for the accompanying research: *Expected utility theory*, *Prospect theory* and *Intuitive judgment approach*. Afterwards, chapter 4, fundamental for the whole thesis, discusses exit decisions: defines exits and relevant decision-maker and applies findings and implications of the three main concepts onto this specific sub-group of decisions. Of course, research on exits stemming from economy and psychology is discussed.

The core principles of human nature relevant for decision-making investigated in this thesis are cognitive processes. The author is aware that this is a simplification while thought processes, more precisely reasoning as far as decision-making is concerned, cannot be isolated from emotional aspects, individual experiences and personality factors as well as social and situational aspects. Nevertheless, due to the immense complexity of humans and their decision-making, the author takes on this simplification of focus, in order to emphasize the subjectivity and limited rationality of human cognition stemming

from the very core of thought processes. For instance, as Lakoff (2006) shows, objective paradigm of hierarchical categorization fails to explain the process of categorization itself, which is the basis of all though. The basic organization of concepts such as colors or directions, in fact, seems to stem from fundaments of human bodily organization and its interaction with environment rather than formal logic rules (Lakoff, 2006). Moreover, even the concepts and descriptive terms of our language originate from this bodily organization and its interaction with environment (Lakoff and Johnson, 2002). Decisional situation, of course, is necessarily rooted in some kind of representation, be it mathematical or colloquial language (Shelly and Bryan in Shelly and Bryan, 1964, p.9).

Therefore, the author believes, it is crucial to look in more depth on cognitive processes (more precisely their limitations and specific "*failures*" to obey the formal rules of logic) involved in decision-making in general as well as applied to specific decisional situations. This thesis attempts to do both. As mentioned, in first part theoretical models are discussed; in second part theoretical implications, namely *sunk cost effect* and *escalation of commitment*, are translated into research efforts and examined in model exit decisional situations. The accompanying research described in Empirical section has two parts: chapter 6 describes Pilot study and chapter 7 Main research. Theoretical background and design of the entire study is detailed in chapter 5. General discussion – chapter 8 - is concerned with the implications of the whole research. Afterwards, chapter 9 discusses methods and factors employed in improving exit decision-making. Lastly, chapter 10 summarizes and concludes the efforts of this thesis. Appendixes and references are found in chapter 11 and 12 respectively.

2 Decision-making under uncertainty

2.1 What is decision-making?

Decision-making can be defined as a choice of action that will lead to desired results fulfilling the decision-maker's requirements, as opposed to problem-solving, which is described as a search for procedure leading to correct or desired results (Skořepa, 2005). In a way, decision-making is choosing between different solutions – procedures leading to desired outcomes found through problem-solving. Many variables play a role in decision-making of a decision maker: individual differences in requirements and preferences, decisional procedures and strategies applied to decisional tasks, extent of decision maker's awareness, and personality factors, such as stress resistance and self-confidence of the decision maker etc. (Skořepa, 2005). Moreover, the decisional situation can take on make forms and structures: decision-making is influenced by the level of structure in decisional situation as well as the variety of possible actions, time range for deciding, complexity of the task etc. (Skořepa, 2005).

While decision-making is so complex, the author narrowed the focus of this thesis on main models of decision-making under uncertainty paying attention to core psychological processes involved, especially reasoning under uncertainty. Thus, the question arises of what reasoning procedures take place in decision-making, which is discussed in the following section.

2.2 How uncertainty influences decision-making

Decisions under uncertainty are basically risky decisions. In other words, while some decisions do not usually involve a risk factor, such as picking a green shirt over a red shirt, other like marrying someone or moving abroad for instance are considered risky, e.g. the consequences of one's choice are a matter of probability (LaBoeuf and Shafir in Holyoak and Morrison, 2005).

Basically, most real-life decisions are risky or ambiguous (ibid.). This means, that these decisions do not bring desired outcomes with certainty but only with a level of probability, which is hard if not impossible to reasonably estimate (LaBoeuf and Shafir in Holyoak and Morrison, 2005). In fact, some authors point out, that estimating probability under uncertainty will require judgments based on opinions and beliefs and subjective understating of the decisional situation before any choice can be taken (Scott, 1967 in Castles, Murray and Potter, 1971). While this thesis in the end aims to examine exit decision-making, which, as will be argued in chapter 4, is most commonly done under uncertainty, focus will be on theoretical knowledge concerning decision-making under uncertainty.

2.3 Judgments and choices

So what is the relation of judgments and choices to decision-making? First, the process of decision-making is to be discussed. Usually, decision-makers are believed to bump into information that leads him/her to form a new goal. As soon as s/he formulates a new objective the search for information about possible strategies, interpreting and evaluating effectiveness of these options to achieve objectives takes place (Scott, 1967 in Castles, Murray and Potter, 1971; Etzioni, 1995). However, Etzioni (1995) abandons this perspective and, based on the findings of H.A. Simon and Kahneman and Tversky's *Prospect theory*, both of which are discussed in further detail in next sections, proposes that choices are most often taken based on judgments that are strongly influenced by emotional and normative aspects of the decisional situations.

Hence, judgments and derived choices can be perceived to deviate from what would be described as rational decision-making (Mullainathan and Thaler, 2000). Mullainathan and Thaler (2000) state a long list of examples of diversions: for judgments they include overconfidence, optimism, anchoring and other heuristics people use to generate quick impressions about the decisional situations (these heuristics are further described in section on *Intuitive judgment approach*). Regarding choices, Mullainathan and Thaler (2000) argue that many instances of suboptimal choices can be observed in real life situations such as overspending or binge eating/drinking etc.

Churchman and Eisenberg take a slightly different perspective on judgments and choices, extending the limited understanding of the term judgments (in Shelly and Bryan, 1964, p.47). They use the 'black box' metaphor to illustrate their view on judgments (ibid.). Churchman and Eisenberg hypothesize, that just like a black box the decision maker uses an unknown logic

resulting in either systematic or unsystematic outputs, which lead to respective choices (in Shelly and Bryan, 1964, p.49). According to these authors, logic hidden within the black box can take on various forms stemming from Bayesian logic through game theoretical logic to intuitive judgments (ibid.). These different logics embedded into the decision maker are referred to as judgments, and can be studied by decomposing their logic into subcomponents (ibid.).

Hence, to summarize, it seems obvious, that judgments as well as choices are core procedures of decision-making and the level of optimality involved depends on the respective reasoning processes. The following section will discuss fundamental models, their contributions and setbacks in describing judgments and choices, attempting to explain individual decision-making under uncertainty.

3 Theories of decision-making under uncertainty

3.1 History

3.1.1 Contribution of statistics to decision theory

The classical theoretical approach to decision-making under uncertainty was derived from probability theory and developed in economics (Sternberg, 2002), stemming from Bernoulli's idea of utility maximization with declining marginal value of each further increase in value, resulting in a concave utility function (Skořepa, 2005; Skořepa, 2006). While probability was firstly defined in frequentist tradition, e.g. through observation in repeated events and therefore often referencing inaccessible probabilities of specific events involving random occurrences, new approach to probability was developed, that could be more easily employed in predicting decision-making under uncertainty (Baccini, 2004).

New statistical approach to decision theory lay in the rise of statistical theory since 1940s. Anscombe (in Shelly and Bryan, 1964, p.160) speaks about two main phases:

1) Waldo's theory of statistical decision functions focused on fully rational decision-making, supposedly performed by a scientist;
2) and Savage's tradition, revitalizing the concept of subjective probability and subjective utility resulting in concave expected utility function were and largely criticizing the former approach.

The latter approach became dominant and was further adapted by Bayes, Laplace and others (Anscombe in Shelly and Bryan, 1964). Despite the introduction of subjective probability and utility, this version of statistical decision theory still relies on the assumption that there are systematic and excessively rational processes driving decision-making. The core assumption introduced by

this normative theory of decisional behavior is that a person's decision-making is based on beliefs represented as preferences, which are supposed to be consistent in nature (Anscombe in Shelly and Bryan, 1964). However, Anscombe argues that *„Consistency has been idealized to the point that the person is postulated to have an infinitely fine perceptiveness. Moreover, ambiguity is not admitted in the matters, about which preferences are expressed, yet there are differences as well as similarities between preferring a scientific hypothesis and laying a bet on a horse. Actual intuitive behavior of scientists (not directly guided by the theory) cannot therefore agree perfectly with the theory."* (Anscombe in Shelly and Bryan, 1964, p. 162)

Despite these setbacks of statistical approach to decision theory, *Expected utility theory* derived from these ideas still dominates the realm of decision-making, especially in the field of economics. Nevertheless, failures to appropriately predict behavior lead to development of different theoretical directions.

3.1.2 Game theory of decision-making

One of the new variations on decision theory stemming from economy and statistics was Game theory. Bred by von Neumann and Morgenstern in 1944, it employs a new and very fruitful metaphor (Gros, 2003; Maňas, 1974; Skořepa, 2005). Game theory represents the decisional situation as a game with players (decision-makers). Players have different choice possibilities, which are referred to as strategies and their eventual gains are called prizes (Gros, 2003).

Why is this metaphor fruitful? Firstly, it simplifies the complex situation and provides terminology for easily describing the course of decision-making of more than one decision-maker (Gros, 2003). Moreover, and more importantly, it

remains a relevant simplification for a large amount of real-life situations, including occurrences on markets (Gros, 2003; Maňas, 1974). Last but not least, the model assumes that through retrieving an infinite set of pulls, a normative for choice preferences can be derived (Maňas, 1974).

However, game theory, just like other theoretical attempts stemming form statistics, is largely limited by the assumption of full rationality of decision-maker, or the so-called *homo economicus* (Sternberg, 2002). In 1950s Herbert A. Simon formulated his concern about limits of rationality given by the nature of human cognitive capacities, which were demonstrated by Allais in experiments with decisional tasks leading to systematic errors (Skořepa, 2005). Introducing these natural cognitive limits to rationality resulting in new directions to the study of decision-making in psychology.

3.1.3 Psychological approaches to decision-making

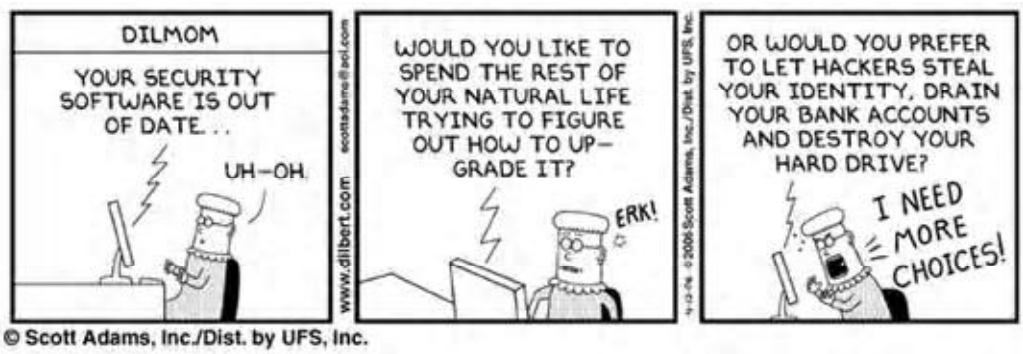
In reaction to new findings about the limits of human rationality in 1950s, psychologists became interested in decision theory as developed by statisticians and economists, and vice versa (Skořepa, 2002; Uhlář, 2006). Psychological compendiums regarding decision-making were being published in 1950s (Uhlář, 2006), but it was in late 1960s that psychology came up with new theoretical attempts explaining decision-making and focusing on psychological processes involved in decision-making (Skořepa, 2005).

3.1.4 Conflict theory of decision-making

One approach focused on the emotional aspect of decision-making in association with the decisional procedures. The existing merely descriptive psychological model of decision-making procedure was hence developed into a

more plausible conflict theory, at least in the sense that it incorporated commonly perceived aspects of decision-making not taken into account by statistical modes.

In other words, people were commonly aware that making a decision, especially making an important decision, induces various amounts of stress related to the risks and potential losses incurred. As is well demonstrated by the following comic strip (source: www.dilbert.com, by Scott Adams, published on April 12th 2006), just like the assistant depicted below, we are aware that a conflict between the desired status and the real options may lead to stressful experiences with potentially serious consequences for our ability to choose.



Janis and Mann (1977) elaborated on this idea and proposed what is referred to as Conflict model of decision-making. Although these authors admit this model is not a general template of decision-making, in specific areas and situations, they argue, it provides fruitful insights into the process of decision-making and its distortions (ibid.).

Janis and Mann's Conflict model of decision-making provides a framework for these and similar findings in perspective of the entire decisional process (Janis and Mann, 1977, p.196-7). According to Janis and Mann (1977, p.190-1) each of their five main stages of decision-making:

1) Appraising the challenge,

2) Surveying alternatives,
3) Weighting alternatives,
4) Deliberating about commitment,
5) Adhering despite negative feedback;

imposes crucial question, which may result in a conflicting reaction of the decision maker. As soon as risks, lack of viable options and/or time pressure take place, one of the conflict reactions are assumed to eventuate, inducing higher stress levels along with distortions of the decision-making process (Janis and Mann, 1977).

Janis and Mann (1977) mention various possible distortions stemming from conflict coping strategies such as hyper-vigilance and defensive avoidance. Due to perceptions of the decisional situation, occurrence of conflict reaction may result in different information distortion based on bolstering tactics. Janis and Mann (1977) list six bolstering tactics, but do not claim definitiveness or exhaustiveness of distortion strategies taking place under conflict conditions:

1) exaggerating favorable consequences,
2) minimizing unfavorable consequences,
3) denying aversive feelings,
4) exaggerating the remoteness of commitment to action,
5) minimizing social surveillance and pressure,
6) minimizing personal responsibility.

To conclude, however beneficial to the development of more complex psychological models of decision-making, Conflict model does not elaborate in depth on the cognitive processes involved. This, so-to-say micro-cognitive perspective was taken on by cognitive psychologists, and by seizing a more behavioral perspective allowed for important advancements in psychological

theories of decision-making under uncertainty. The most crucial were: the establishment of Prospect theory, which was and remains the first and most discussed counter-model to Expected utility theory as it remains simple enough to produce precise predictions but seems to have broader explanatory force than the economical model; and Intuitive judgment approach, that adopted a much more microscopic perspective on cognitive errors called heuristics and biases involved in judgment and influencing choice (Skořepa, 2005; Sternberg, 2002).

The lastly mentioned approaches to decision theory, Expected utility theory, Prospect theory and Intuitive judgment approach are crucial for the purposes of this thesis while they are the lenses through which exit decisions, the core topic, are to be viewed and researched. Therefore, they will be presented and thoroughly discussed in the following sections.

3.2 Expected utility theory

As mentioned in previous section, the classical theory of choice, stemming mainly from statistical analysis and economics, Expected utility theory, treats decisions as rational choices based on coherent preferences of the decision-maker. The decision maker is supposed to evaluate all alternatives, assign what is called *subjective utility* (or individual preferences) to each and choose the highest rated option (LaBoeuf and Shafir in Holyoak and Morrison, 2005). Of course under uncertainty, this process is expected to be more complex as subjective probabilities need to be assigned to the various alternatives and these are to be combined with subjective utilities to obtain *expected utility* (Uhlář, 1984). Again, choice is then made for the highest-rated option (LaBoeuf and Shafir in Holyoak and Morrison, 2005).

Two assumptions about preferences form the backbone of this model (Fishburn, 1970):

1) preferences govern decision in that more preferred alternative is chosen over a less preferred one,
2) decision-maker's underlying preferences are coherent, consistent and available to the decision-maker.

Thus, observing coherent choices based on coherent utilities should give a function of utilities and, hence, also of the preferences on which utilities are based. This function was first characterized in 18th century by Bernoulli, who suggested that subjective (or expected) utility function will be concave due to aversion to loss, this means, that people value gains higher if they significantly increase their wealth (LaBoeuf and Shafir in Holyoak and Morrison, 2005; Skořepa, 2006). To define this relation, a person prefers A to B just when (Skořepa, 2006, p.3):

$$EU(A) \equiv \sum_{i=1}^{n} p_{iA} * u(x_i) > EU(B) \equiv \sum_{i=1}^{n} p_{iB} * u(x_i),$$

where *EU* is expected utility of an event, *A* and *B* refer to different events, *p* is probability of an event, and $u(x_i)$ is the utility function.

3.2.1 Rationality in Expected utility theory

Despite the elegance of this approach, it was largely criticized for its oversimplification of decisional processes and inadequacy in predicting and explaining model-inconsistent empirical findings and common limitations.

The first and most crucial criticism was raised by Herbert A. Simon, who pointed out that this model did not account for major limitations inherent to human processing system, namely to its capacity (LaBoeuf and Shafir in Holyoak and Morrison, 2005; Sternberg, 2002 and others). As the following comic strip points out, it is hardly in Dilbert's capacity to do such thing as analyze every possible option, of which he is well aware and retribution to Nemesis for his spiky remark comes shortly (source: www.dilbert.com, by Scott Adams, published on August 14th 2006).

The rationality of decision-maker has withstood large criticism even from the side of economists. As Thaler noted: *„Earlier economists such as Irving Fisher, John Maynard Keynes, and Benjamin Graham* […] *put great emphasis on*

the fallible nature of human decision-making" (Thaler, 1994, p.1), however, he argues, in modern finance studies, this realistic perspective was replaced with models of fully rational opposed already by Simon's concept of bounded rationality (Mullainathan and Thaler, 2000). According to Mullainathan and Thaler (2000) the three main arguments usually stated to provide support for this perspective cannot be sustained:

1) *The power of markets.* Mullainathan and Thaler (2000) point out that "*irrational*" financial behavior, for example pushing prices in the wrong direction such as buying out goods to heighten the prices, may often pay out. Leading him to conclude, that markets are not strong enough to wipe out quasi-rational behavior.
2) *Evolution.* Mullainathan and Thaler (2000) argue, that both sides of the coin can be supported by evolutionary arguments, irrationality of over-confidence as well as rationality of appropriate confidence can turn out to be good survival strategies (for instance an appropriately confident agent will rationally back out when faced with an overconfident competitor). Leading him to conclude that even systematic errors perceived as sources of quasi-rational decision-making can, in fact, turn out to be adaptive strategies.
3) *Convergence to rationality.* Mullainathan and Thaler (2000) show that since there are always opportunity costs to changing the status quo, even a rational agent will prefer to sustain rather than change it, thus eliminating learning. Moreover, as game theory showed, convergence to equilibrium strategy may take extremely long time, given that markets are constantly changing *„one can*

easily be in a situation of perpetual non-convergence" (Mullainathan and Thaler, 2000, p.3).

Moreover, not only does Mullainathan and Thaler (2000) put through that the main arguments still used to support the model of rational agents in decision-making cannot be sustained, but add that *„the standard model ignores these bounds and hence heuristics commonly used. As shown by Kahneman and Tversky* […]*, this oversight can be important since it can lead to systematic errors"* (Mullainathan and Thaler, 2000, p.3). Mullainathan and Thaler (2000) conclude, that neither competition, nor learning or evolution can account for the assumptions of unbounded rationality, willpower and selfishness embedded in the model of representative agents in decision-making need to be adjusted.

In psychology as opposed to economics, the concept of bounded rationality first suggested by H.A.Simon, has been largely employed and elaborated. Two different concepts of bounded rationality are distinguished by Kahneman and Frederick (in Holyoak and Morrison, 2005): *coherence rationality* and *reasoning rationality*.

The first is described by these authors as a normative conception, assuming the whole framework of individual's beliefs and preference is coherent and consistent, which implies that it is also supposed to be resistant to contextual or framing effects. However, research findings point out, that framing and situational factors affect decision-making significantly, therefore violating this assumption. For instance, people make common mistakes based on context of the situation such as probability assumptions in the Linda experiment made by Kahneman and Tversky (Sternberg, 2002, p.425): with regards to the context, people tend to overweight the probability that Linda is a bank clerk and a feminist

over her being just a bank clerk, which is a clear violation of the rules of probability (Sternberg, 2002).

The second notion of rationality – reasoning rationality – Kahneman and Frederick describe as less demanding in the sense that it *„only requires an ability to reason correctly about the information currently at hand without demanding perfect consistency among beliefs that are not simultaneously evoked"* (Kahneman and Frederick in Holyoak and Morrison, 2005, p.277). However, the notoriously known four card experiment[1] points out that even the assumption of mere reasonability is overestimating the actual choice processes humans perform. Hence, it seems that any rationality assumption posed on human-decision making, let alone the unbounded rationality concept involved in Expected utility theory, are exaggerating actual human processing capabilities.

Nevertheless, some authors suggest that despite somewhat irrational, strategies people employ may in fact be efficient. Simon's original concept of bounded rationality was built on the idea of human evolution strongly associated with respective environment. In recent years, Gigerenzer and Goldstein (1996) revitalized Simon's idea of understanding human decision-making in the context of environment. They suggested that non-optimal decision-making strategies as limited by cognitive capacities make sense in the context of the decision-maker's environment. That is, constraints such as limited time, knowledge and computational force, are necessarily part of human environment and transfer well into strategies, which are breaking the rules of optimal decision-making, for instance satisficing as suggested by Simon (Simon, 1959 in Castles, Murray and

[1] In this experiment subjects are given four cards: U, 8, M, and a 7, and are told that each card with a number has a letter on the other side (Horn, Lovallo and Viguerie, 2006). Then subjects are asked how many cards they need to turn to validate the statement that *"If a card had a vowel on one side, then there must be an odd number on the other side"* (ibid.). Most subjects chose U correctly, but tend to reconfirm by unnecessarily turning 7 as well (ibid.).

Potter, 1971; Simon, 1969; Janis and Mann, 1977); or currently extensively explored heuristics and biases (Gigerenzer and Goldstein, 1996, p.651). In fact, these authors believe human strategies manage to utilize features of the environment and cognitive processes to improve the pace and efficiency as well as effectiveness of real-world decision making (ibid.). This idea will be further discussed in section *3.4.2 Criticism of Intuitive judgment approach*.

Despite large criticisms of the above mentioned studies and examples evoked (mostly dispraising them as mere exceptions), it seems undeniable to the author, and to many researchers in this area (Sternberg, 2002; Kahneman and Frederick in Holyoak and Morrison, 2005; Mullainathan and Thaler, 2000; and others), that there is something at work here that the normative notions of rationality and reasoning do not appropriately predict. As Simon puts it: *„Broadening the definition of rationality to encompass goal conflict and uncertainty made it hard to ignore the distinction between the objective environment in which the economic actor ‚really' lives and the subjective environment that he perceives and to which he responds. When this distinction is made, we can no longer predict his behavior – even if he behaves rationally – from the characteristics of the objective environment; we also need to know something about his perceptual and cognitive processes"* (Simon, 1959, p.41 in Castles, Murray and Potter, 1971).

3.2.2 Further criticism of Expected utility theory

Further criticisms of the Expected utility theory arose aiming at assumptions besides unlimited rationality, which constitute the classical model. Researchers showed, that even the core assumption of stable preferences, upon

which the model of Expected utility is based, is refuted by empirical evidence, showing that framing of the decisional task influences decision-making.

Already in 1953 Allais demonstrated that there exist pairs of choices, which clearly break the preference invariance axiom of Expected utility theory (Skořepa, 2006). According to Skořepa (2006, p.5) Allais presented sets of choices, where one choice promised solid gain with certainty and one with mediocre probability of better gain. The first was largely preferred, hence the core axiom of Expected utility theory was controverted, while certain choice was preferred to complementary choice, while equivalent set of choices with smaller certainty levels showed opposite tendency. Allais imposed these choices onto economists, including the famous statistician Leonard Savage, one of the fathers of Expected utility approach, who made the same mistake of breaking the core axiom of Expected utility theory (Skořepa, 2002; Skořepa, 2006). His results were later repeated by Kahneman and Tversky on larger samples with more ecologically valid tasks, which further supported the view, that decision-makers do not behave as the classical model assumes (Skořepa, 2006).

Tversky and Thaler (1990) presented various studies that elaborated on this so-called *preference reversal phenomenon* (ibid.). Lichtenstein and Slovic, for example, observed that elicited preferences are influenced by the method of eliciting them (in Tversky and Thaler, 1990, p.203). Lichtenstein and Slovic argued that it should be possible to set up pairs of gambles with reversed preferences, such as when asked to *choose* a gamble, subject picks A, but when *valuing* gambles, s/he values B higher (ibid.). Based on empirical findings, these authors argue, that preference reversals are mainly due to failure to sustain procedure invariance, e.g. overpricing low probability with high gain gambles (Tversky and Thaler, 1990, p.206).

Further research supported invalidity of the premise that decision-making is not distorted by varying the characteristics of the decisional task and context (LaBoeuf and Shafir in Holyoak and Morrison, 2005). For instance, in one experiment by Tversky and Shafir, merely presenting more than one attractive option (in this case two instead of one choice of CD player), the percentage of those who choose one or the other rather than neither declined significantly (Tversky and Shafir, 1992, in Holyoak and Morrison, 2005). Thus, leading the author to conclude, that empirical findings show a lack of invariance in preferences and choice procedures, which further derogates predictive capacity of classical Expected utility model.

Additionally, further aspects of Expected utility model were contradicted by empirical findings. For instance risk neutrality of the expected utility function was largely refuted by research. For example Samuelson's experiments: according to his results, people tend to decline a single gamble, even one with positive expected utility, but may accept a series of the same gambles (in Rabin and Thaler, 2001). Similarly, previously mentioned instances of preference-reversal phenomenon can be viewed as breaking the risk-neutral approach anticipated by Expected utility model.

This mounting evidence led to development of new approaches in studying decision-making. New accounts of decision-making evolved, though they might not be as elegant and comprehensive as the classical model, they managed to bring empirics more in line with the models (LaBoeuf and Shafir in Holyoak and Morrison, 2005). Nevertheless, the classical theory still largely remains the normative for assessing optimality of decisions (LaBoeuf and Shafir in Holyoak and Morrison, 2005).

3.3 Prospect theory

In part as a reaction to criticism of the Expected utility theory and as an expansion of research efforts in decision-making, psychologists Kahneman and Tversky developed a new model of decision-making attempting to account for systematic features of human behavior neither explained nor predicted by the Expected utility theory. They focused mainly on adapting the main parts of the previous model and expanding the model to accompany the systematic deviances of human decision-making observed in research.

Firstly, Kahneman and Tversky reevaluated and remodeled main propositions suggested by the Expected utility theory. First inadequacy of the classical model according to Kahneman, Knetch and Thaler (1991) lies in the concept of non-intersecting indifference curves, implying consistent and reversible preferences. As was mentioned in previous section, empirical findings suggest that preferences often violate this assumption. Kahneman and Tversky (1979) demonstrate this on four observed effects:

1) *Certainty effect* – as Allais noted in 1953, people tend to overweight gambles with certain results over gambles with less certain results. On the other hand they overweight higher gains in improbable gambles over more probable but smaller gains (Kahneman and Tversky, 1979). It seems therefore, that through this effect reversibility of preferences is distorted.
2) *Reflection effect* – Kahneman and Tversky (1979) point out, that while loss aversion may account for possible gains, in the domain of possible losses the expected utility curve mirrors its positive part resulting in risk seeking.

3) *Probabilistic insurance effect* – purchase of insurance often serves as evidence for loss aversion and hence concavity of the utility function, but as Kahneman and Tversky (1979) show, people prefer insurance policies with limited coverage and zero or low deductibles over higher coverage policies with higher deductibles, clearly disobeying the concavity of loss-averse utility function. Moreover, Kahneman and Tversky (1979) suggest that people dislike probabilistic insurance (an insurance policy involving a small probability that the consumer will not be reimbursed) and demand more than a 20% reduction in the premium to compensate for a 1% default risk, again violating the concavity of expected utility function (Kahneman and Tversky, 1979; Wakker, Thaler and Tversky, 1997).

4) *Isolation effect* – different choices are considered differently depending on, which sets of gambles are considered, while people tend to evaluate choices based on their distinguishing attributes (Kahneman and Tversky, 1979).

In addition, Knetsch (1990, in Kahneman, Knetch and Thaler, 1991, p.197) showed that the so-called endowment effect[2] in fact leads to crossing indifference curves[3]: one group of students received a pen and the other received $4.50, then either accepting or rejecting offers to gain/give up the pen.

[2] Endowment effect describes the observation that mere ownership raises the value one attributes to a good or service etc., breaking the assumption that willingness to pay for something is equivalent with willingness to accept for something, which underlies the classical Expected utility model (LaBoeuf and Shafir in Holyoak and Morrison, 2005, Wikipedia, 2007, a)).

[3] Indifference curves interconnect what is believed to be equivalent wealth states. All points on the curve are hence supposed to render equivalent utilities, which represent preferences in the Expected utility model. In addition, each curve is expected to represent a certain level of wealth, and while higher wealth is supposed to be valued higher, indifference curves are not expected to intersect (Wikipedia, 2007, b))

The results depicted in Figure 1 below show, that mere ownership of a pen changes the value of giving it up, resulting in intersecting indifference curves, which break the classical expectation of non-intersecting indifference curves for equivalent wealth states (Kahneman, Knetch and Thaler, 1991, p.197).

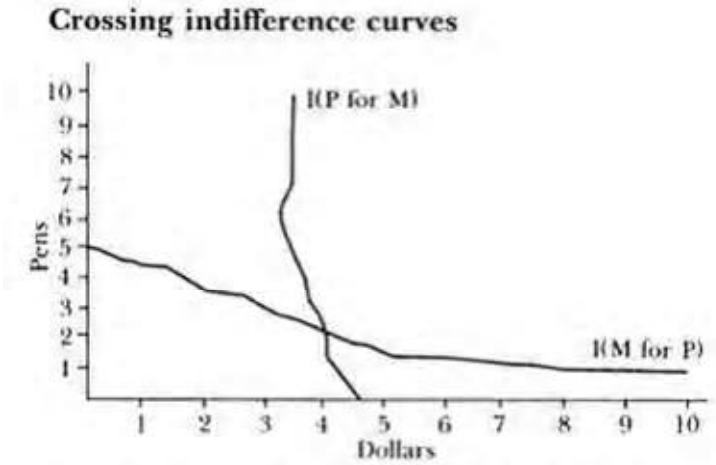


Figure 1: Crossing indifference functions (source: Kahneman, Knetch and Thaler, 1991, p.197)

Similarly as with owning a pen, people seem to value the costs of leaving a status quo and the loss of its' advantages higher than the possible gains from change (Kahneman, Knetch and Thaler, 1991). As it seems, a phenomenon known as risk aversion takes place (LaBoeuf and Shafir in Holyoak and Morrison, 2005, p.248). Therefore, creating grounds for the status quo bias, e.g. the tendency to averse a possible loss, which outweighs the attractiveness of possible gains (ibid.).

Status quo bias was demonstrated in a series of experiments conducted by Samuelson and Zeckhauser (1988, in Kahneman, Knetch and Thaler, 1991, p.198): participants were asked to invest an inheritance; in control condition no investment was yet made, in experimental condition large portion of inheritance was already invested in medium risk company. Similar scenarios under the same

design were investigated by these researchers. Results confirmed, that the status quo choice in experimental condition was picked significantly more often compared to control condition. In fact, the effect was further amplified by a higher number of competing alternatives to the status quo choice.

To conclude, empirical findings showing endowment effect and status quo bias support the hypothesis that violations to invariance in preference assignment, which are systematic in nature, take place (Kahneman, Knetch and Thaler, 1991; Kahneman and Tversky, 1979). Hence, suggesting inadequacy of coherent reversible preferences hypothesized in Expected utility theory. These findings, Kahneman, Knetch and Thaler (1991) argue, imply significant changes to the Expected utility model of decision-making. Mainly, the expected consistency of preference order must be abandoned.

In addition to this crucial change in the decision-making model, Kahneman and Tversky (1979) also pointed out, that various differences in probabilities, do not seem to be handled equally, as the expected utility theory would assume. As LaBoeuf and Shafir put it: *„according to prospect theory, probabilities are not treated linearly; instead, people tend to overweight small probabilities and underweight large ones"* (LaBoeuf and Shafir in Holyoak and Morrison, 2005, p.245). One of the effects of non-linear treatment of probabilities is a large gap in preferences for certain vs. less certain or uncertain gains/losses (LaBoeuf and Shafir in Holyoak and Morrison, 2005). Hence, another one of the most important contributions of Prospect theory is that it deals with gains and losses respective to a reference point rather than absolute values of wealth (LaBoeuf and Shafir in Holyoak and Morrison, 2005, p.245).

Kahneman and Tversky further researched the treatment of probabilities in decision-making and found that decision makers display a four-fold pattern for

different probabilities in either gains or losses (Skořepa, 2006). For gains, people seek risks if probability of extreme result is small and *"play it safe"* when the probability of extreme result is mediocre or high; on the other hand, for losses the patter is reversed – risk seeking takes place for mediocre or high probability of loss and risk aversion when extreme loss is improbable (Kahneman and Tversky, 1979; Skořepa, 2006).

In other words, according to Kahneman and Tversky (1979), people seem to choose a more risky prospect of loss rather then a smaller but certain loss. For instance, when faced with a gamble of a 50% chance of loosing 200 $ or 100% chance of loosing 100 $, people prefer the first choice to the second and vice versa if loss is replaced by gains (LaBoeuf and Shafir in Holyoak and Morrison, 2005). Moreover, this tendency is stronger for potential losses than potential gains, approximately twice as strong (LaBoeuf and Shafir in Holyoak and Morrison, 2005; Kahneman and Tversky, 1979; Kahneman, 2002; Rabin and Thaler, 2001; Skořepa, 2006).

Hence, leading to crucial transformation of the expected utility function from the economic model into what Kahneman and Tversky call a *"value function"*, which is more explanatory regarding empirical findings: Kahneman and Tversky derived the S-shaped value function, accounting for reference point, distinguishing gains and losses and steeper risk preferences for losses than for gains, as shown in Figure 2 below:

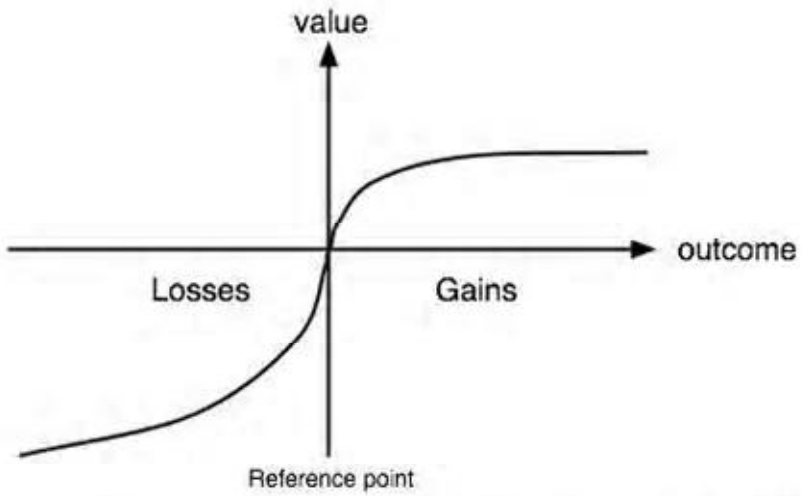


Figure 2: A hypothetical value function (source: Kahneman and Tversky, 1979, p.279)

The most commonly quoted research findings supporting different treatment of gains and losses are again those concerning *endowment effect* mentioned before.

Similarly, Loewenstein and Thaler note, that distinctions in treatment of gains and losses takes place in intertemporal choice (such, where there is a delay between costs incurred and benefits received) in the sense that *„subjects demand more to wait past the expected arrival date than they are willing to pay to speed up its expected arrival"* (Loewenstein and Thaler, 1989, p.187). In addition, it seems that just as Prospect theory suggested discount rates used in mental discounting of future cash flows[4] for gains are significantly higher than for losses, in other words, people take less risk to receive gains, but take more risky decisions in order to postpone a loss (Loewenstein and Thaler, 1989).

[4] In finance, discounted cash flow refers to a method of valuing a project or an entire company using the concepts of the time value of money. All future cash flows are estimated and discounted to give a present value of what they are expected to be worth using a discount rate representing the appropriate cost of capital, and incorporating riskiness of the future cash flows (Wikipedia, 2007 c)).

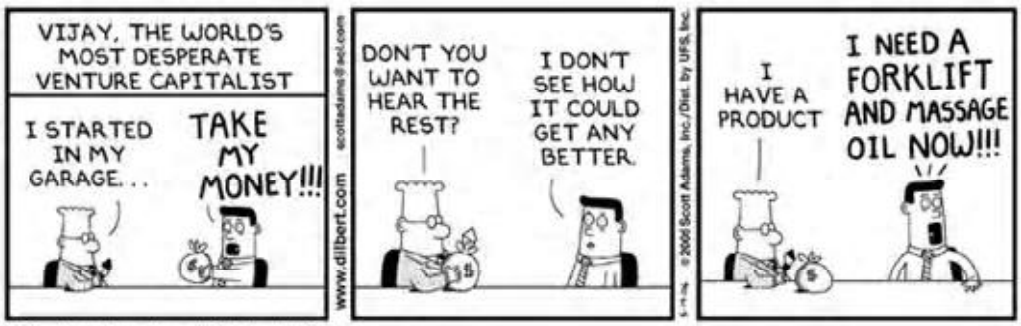
To conclude, Prospect theory by Kahneman and Tversky (1979) presented theoretical background for empirical data not accounted for by the Expected utility theory. They showed, that difference in risk seeking or risk aversion for losses and gains respectively, leads to failures in normative invariance suggested by the classical model. It seems that the frame of reference, despite equal outcomes, induces different strategies, e.g. risk aversion for gains vs. risk seeking when the situation is framed as a potential loss (LaBoeuf and Shafir in Holyoak and Morrison, 2005, p.245). It should be noted, however, that even though this model accounts for more empirical findings than the Expected utility theory, it remains a simplification of decision-making and does not resolve all empirical observations (Skořepa, 2006).

3.4 Intuitive judgment approach (heuristics and biases)

Both approaches to decision-making, Expected utility theory and Prospect theory, are models that simplify decisional processes, and are intended for predictions about the behavior of decision-makers, but neglect the intra-psychological processes involved in the decisional procedure as such. Hence, they are based on assumptions that decisional processes take place as in a black-box with more or less systematic results. However, neither of these models answers the following question: *What does the processing itself look like?*

People, the best specialists on their own behavior, are aware that quite often, their decision-making is strongly influenced by judgments based on fragmentary information or even unconscious incentives. Researchers also noticed, that reasoning displays systematic anomalies. As LaBoeuf and Shafir point out, reasoning can be *„heavily influenced by salience, availability, or momentary context"* (LaBoeuf and Shafir in Holyoak and Morrison, 2005, p.251).

Stemming from research on systematic errors in expert judgment emerged the heuristics and biases approach, known also as Intuitive judgment approach (Kahneman and Frederick in Holyoak and Morrison, 2005). As the following comic strip demonstrates (source: www.dilbert.com, by Scott Adams, published on May 19th 2006):



Vijay has intuitively decided to invest in Dilbert's project. He is probably not well aware of his reasons, he did not correct his judgment by considering the project thoroughly, but he certainly has a small chance to profit on it eventually. So what cognitive structures and processes take place when we decide and, while systematic errors are observed, in what direction and when do they take place?

Intuitive judgment approach, or heuristics and biases approach, attempted to answer these questions. It is based on a distinction between two cognitive systems co-acting in decision-making: one system is generating what Kahneman (2002) calls *impressions*, which may be involuntary as well as unconscious similarly to perception, and a second system producing *„explicit and intentional"* judgments (Kahneman, 2002, p. 451). The intuitive judgment approach focuses on judgments that the second system bases on impressions derived from System 1. The respective content and processes from perception through reasoning as described by Kahneman (2002) are depicted in Figure 3 below (Kahneman, 2002, p. 451).

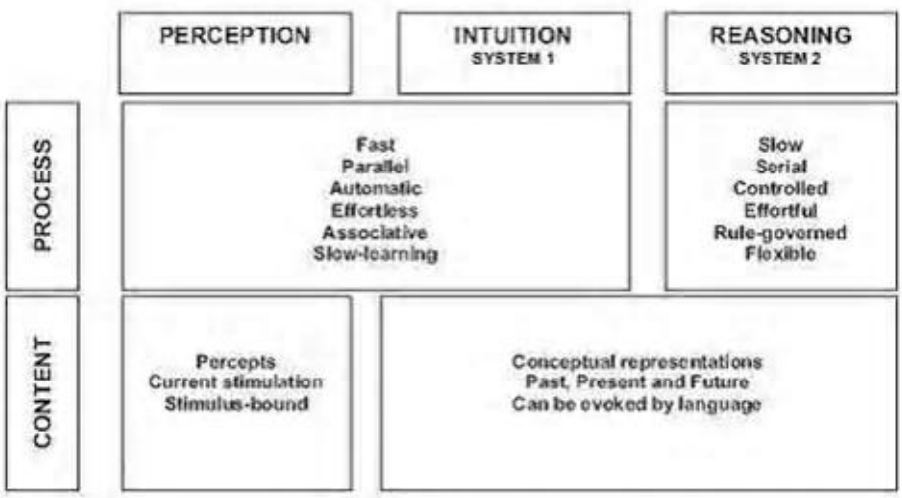


Figure 3: Processes and their contents taking place under perception and System 1 and 2

To sum up, this approach is based on the theory of dual processing: automatic parallel operations linked to perception, and controlled serial operations of reasoning (Kahneman and Frederick in Holyoak and Morrison, 2005, p.267). Intuitive judgment is positioned between these processes, operating on mental representations and working similarly to percepts with a low level of control (Kahneman and Frederick in Holyoak and Morrison, 2005; Kahneman, 2002).

Nevertheless, it is important to note, that dual processing model does not claim definitive segregation of each mental operation to one of the systems (Kahneman and Frederick in Holyoak and Morrison, 2005). In fact, Kahneman and Frederick argue, *„The placement of dividing lines between the systems is arbitrary because the bases by which we characterize mental operations (difficulty of acquisition, accessibility to introspection, and disruptability) are all continua. However, this does not make distinctions less meaningful; there is broad agreement that mental operations range from rapid, automatic, perception-like impressions to deliberate computations that apply explicit rules or external aids"* (Kahneman and Frederick in Holyoak and Morrison, 2005, p.288).

Thereafter, the two systems, as Kahneman and Frederic (in Holyoak and Morrison, 2005) propose, interact. More specifically the controlled serially operating system (also referred to as System 2), is responsible for controlling and correcting biased judgments stemming from System 1 (automatic parallel operation system). This interaction is well depicted by the Stroop effect: subjects are asked to read out loud words designating colors that are written in mismatched color writing. Although they usually manage to correct for the mismatches, corrections result in delays and hesitations (Kahneman and Frederick in Holyoak and Morrison, 2005). To summarize, as long as System 2

does not intervene, intuitive judgment decides automatically. However, if System 2 does in fact check and reevaluates the judgment, intuitive judgment errors may be at least partially, or even entirely corrected (Kahneman and Frederick in Holyoak and Morrison, 2005).

The intuitive judgment approach suggested, that people tend to look for answers to complex problems such as how many people under the age of 25 die in car crashes and similar using the automated simplification of this problem to available and/or representative instances that come to their minds regarding the given question (Kahneman and Frederick in Holyoak and Morrison, 2005). Hence, uncorrected intuitive judgments were shown to be systematically skewed by relying on various *heuristic judgments* (Kahneman and Frederick in Holyoak and Morrison, 2005). Three basic judgmental heuristics were identified: *representativeness*, *availability* and *anchoring* (Kahneman, 2002; Gilovich and Griffin in Gilovich, Griffin and Kahneman, 2002).

Representativeness heuristic, refers to the way people tend to evaluate probability of events in the context of how well it corresponds with perceived population of such events (Sternberg, 2002). Similarly, correspondence of characteristics of the considered event with expected characteristics of the population of such events is taken into account (ibid.). For instance, as shown in a classical experiment conducted by Kahneman and Tversky in 1972 about probability of children sequence in families, people underestimate a less representative event or sequence, in this case event with uneven allocation of sexes or one that simply does not seem accidental enough (in Sternberg, 2002)[5].

[5] The question was how many families in one town had the sequence of children 'boy, girl, boy, boy, boy, boy' if 72 families had the sequence of children 'girl, boy, girl, boy, boy, girl', but people systematically underestimated the number below 72, which is the most suitable estimation (Sternberg, 2002, p.432).

According to Schwarz and Vaughn, *availability* heuristic refers to findings that people tend to estimate the probability or frequency of an occurrence based on the availability of instances or associations of similar events for recall (Schwarz and Vaughn in Gilovich, Griffin and Kahneman, 2002). In other words, if you can easily recall an instance of a crashed plane, you assume it is more probable that a plane will crash. The recall itself and the ease, with which it was accomplished, influence the estimated likelihood of an event or occurrence (Schwarz and Vaughn in Gilovich, Griffin and Kahneman, 2002). This was also shown in a simple experiment by Kahneman and Tversky in 1983: when people were asked to estimate how many of 2 000 words will end in either –ing or –n- the first (-ing group) gained more than twice as high estimates than the second (-n- group) due to higher availability of words ending with –ing than merely with –n- although the second is clearly a broader group of words than the first (in Sternberg, 2002, p.435).

Thanks to the concept of heuristics, the intuitive judgment approach turned out to be more universal than the initial expert judgment research would have suggested. In fact, Kahneman and Frederick argue that what these heuristic judgments have in common is a process of *attribute substitution* (Kahneman and Frederick in Holyoak and Morrison, 2005). This means, that people tend to automatically substitute the targeted characteristic the problem asks about, if it is not directly or easily accessible, by a more available alternate attribute that yields a simpler but plausible solution to the problem they were facing (Kahneman and Frederick in Holyoak and Morrison, 2005). This substitution can be made conceptually or semantically. Nevertheless, despite the fact that it largely accounts for initial inputs into judgment, it is not necessarily its sole basis. Kahneman and Frederick believe that *„Initial impressions are often*

supplemented, moderated, or overridden by other considerations, including the recognition of relevant logical rules and the deliberate execution of learned algorithms. The role of these supplemental or alternative inputs depends on characteristics of the judge and the judgment task." (Kahneman and Frederick in Holyoak and Morrison, 2005, p.287)

In addition to attribute substitution, according to Kahneman and Frederick a more general process of intuitive judgment is at play: namely the *accessibility effect*, which encompasses also the anchoring heuristic/effect (Kahneman and Frederick in Holyoak and Morrison, 2005). *Anchoring* is referred to in three ways:

1) Procedure, where an *"anchor"* or an uninformative number is presented to subjects
2) Result of the process, where estimating an initial value anchors further estimating in proximity of this initial value.
3) Psychological process underlying anchoring procedure and its results (Chapman and Johnson in Gilovich, Griffin and Kahneman, 2002).

Classical experiments representing anchoring include introducing an irrelevant anchor, such as retrieving last three digits of one's phone number, and then estimating Genghis Khan's date of death (Roxburgh, 2003). Results show correlation between the three digits of one's phone number and the estimation (Roxburgh, 2003). Anchoring was found to influence many everyday judgment tasks requiring numerical judgments such as estimation of risks, statistical inferences, and predictions of performance etc. (Chapman and Johnson in Gilovich, Griffin and Kahneman, 2002). As Kahneman and Frederick (in Holyoak and Morrison, 2005) explain, higher accessibility of a substitutive attribute or, in the case of anchoring effect, of a substitutive value and lower or no accessibility

of relevant target attributes/anchors is the common process behind the heuristics described so far.

Resulting from the attribute substitutive use of heuristics are systematic biases in judgment, commonly based on underweighting or overweighting of relevant criteria (Kahneman and Frederick in Holyoak and Morrison, 2005). Some these involve *„neglect of base-rate information, overconfidence and overestimates of the frequency of events that are easy to recall"* etc. (Kahneman, 2002, p. 465).

For example, overconfidence and over-optimism, although not universal, often drive human conduct under uncertainty (Griffin and Tversky in Gilovich, Griffin and Kahneman, 2002). In fact, the higher the uncertainty, the more optimistic and confident predictions decision-makers make (Armor and Taylor in Gilovich, Griffin and Kahneman, 2002).

Though overconfidence, similarly to optimism, is argued to be adaptive as they boost risky ventures and thus drive new accomplishments (Armor and Taylor in Gilovich, Griffin and Kahneman, 2002), they often result in tragic consequences in contexts such as diagnosing a patient or estimating his/her chances of survival problem (Griffin and Tversky in Gilovich, Griffin and Kahneman, 2002). Therefore the question arises: To what extent can intuitive judgments, heuristics and biases, be in fact influenced and corrected? Possible answers are to be discussed in the following section.

3.4.1 Improving intuitive judgments

This section is dedicated to research concerning correction of the above described heuristics and biases using the System 2 feedback correction. For example, Weinstein and Klein attempted to influence risk perception in order to diminish biases in decision-making of patients, however, despite informing about risks, encouraging comparing their case with different risk levels, or generating factors influencing the likelihood of certain occurrence, the level of personal risk perception was not systematically influenced (in Gilovich, Griffin and Kahneman, 2002). Supporting the claim that: *„Although overconfidence is not universal, it is prevalent, often massive, and difficult to eliminate"* (Griffin and Tversky in Gilovich, Griffin and Kahneman, 2002, p.248).

Overconfidence may also result in the common effect of planning fallacy, undervaluing the vast number of possible future conditions and overvaluing the desired scenario - people take an overly optimistic approach to their forecasts (Buehler, Griffin and Ross in Gilovich, Griffin and Kahneman, 2002). However, in situations like judging overall happiness of a person or already mentioned probability of surviving surgery, there are barely any objective cues for weighting the importance of different criteria involved (Kahneman and Frederick in Holyoak and Morrison, 2005). Some judgments, therefore, have no optimal solution due to lack of information and biases in these judgments cannot be avoided (ibid.). Moreover, results people attain do seem to correlate with people's predictions, despite their overoptimistic nature (Armor and Taylor in Gilovich, Griffin and Kahneman, 2002).

Nevertheless, some factors may indeed enhance elimination or at least easing of systematic bias. For instance, individual's cognitive abilities (commonly referred to as intelligence) play a positive role in improving intuitive reasoning

(Kahneman, 2002; Kahneman and Frederick in Holyoak and Morrison, 2005). As long as the problem is not overwhelming for decision-maker, and necessary cues and information are available, better cognitive abilities were found to positively correlate with corrected judgments (Kahneman and Frederick in Holyoak and Morrison, 2005).

Moreover, framing as already discussed along with the structure of the problem can hinder or facilitate reasoning (Kahneman and Frederick in Holyoak and Morrison, 2005). Similarly, findings show that cognitive processes involved in decision making are influenced by the context. For example, if information about goals and sub-goals are specified, the reliability and effectiveness of problem solving is increased, in fact it increased more significantly then by the means of direct feedback (Brichcín, 1999). In addition, the quality of outcomes is augmented (Brichcín, 1999). Likewise, lack of time pressure or the organization of necessary information that draws attention to cues correcting reasoning improves judgments (Kahneman and Frederick in Holyoak and Morrison, 2005).

Gigerenzer and Edwards (2003) also suggested that understanding of statistical information, mainly risks, which play a crucial role in many areas such as medicine, can be enhanced by translating percentage or probabilistic data into more intelligible presentations such as relative frequencies (for instance, instead of a 30% chance of side effects, a medicament has side effects in 3 out of 10 patients). Similarly, even conditional probabilities can be translated in what the authors call natural frequencies (for example, if probability of breast cancer is 0.8% and in these cases 90% have positive mammography result can be translated into 8 women in thousand have breast cancer, 7 out of these 8 women will have positive mammography). According to authors such translations evoke

a better communication, understanding and most importantly integrating of the data into decision-making (Gigerenzer and Edwards, 2003).

However, Kahneman concludes: *„Most behavior is intuitive, skilled, unproblematic and successful* [...] *In some fraction of cases, a need to correct the intuitive judgments and preferences will be acknowledged, but the intuitive impression will be the anchor for the judgment. Under-correction is more likely than over-correction in such cases. A conservative general prediction is that variables that are neglected in intuition will remain underweighted in considered judgments"* (Kahneman, 2002, p. 483).

3.4.2 Criticism of Intuitive judgment approach

The Intuitive judgment approach, in addition to the Prospect theoretical model forms a strong basis for understanding and explaining empirical findings stemming from research on decision-making under uncertainty. Nevertheless, criticism has been raised against the normative standard applied to decision-making. As it appears, Intuitive judgment approach relies on the concept of normative decision-making, which remained defined as fully rational and comprehensive, as in the Expected utility model. However, some authors suggested a new viewpoint on optimality of decision-making.

In other words, Goldstein and Gigerenzer (2002) criticized the assumed non-optimality of decisional results stemming from sub-optimal judgments. That is, heuristics and biases approach implies that these are non-optimal procedures resulting in non-optimal choices (Goldstein and Gigerenzer, 2002). However, these authors argue, that instead of perceiving heuristics and biases as below optimal strategies, they should be viewed as *adaptive strategies* (ibid.).

Their argumentation is based on a different approach to what constitutes normative reasoning under uncertainty: Goldstein and Gigerenzer (2002) suggest that rather then taking the normative for reasoning, which stems from Expected utility model, reasoning strategies such as heuristics should be considered in the context of psychological mechanisms, which are the basis for handling complex decisional situations and pose limitations as well as adaptive, effective and ecologically rational strategies. In other words, Gigerenzer acknowledges the fact that heuristics and biases lead to errors, but proclaims that errors are a crucial part of intelligence of our cognitive decision-making system, because they involve negative errors leading to suboptimal solutions as well as positive errors, which strongly improve the effectiveness and efficiency of decisional system (Gigerenzer, 2005).

To illustrate what is meant by good errors Gigerenzer (2005) uses a parable with memory: he shows that perfect memory is undesirable, e.g. we are bound to forget in order not to congest the processing capacity of our working memory and hence impair abstracting and inferring. Or, classical normative of decision-making includes consideration of relevant criteria and all possibly available information, which the author suggests, would congest our processing capacity and inhibit our ability to choose.

This new approach to heuristics therefore implies that heuristics can and in fact do fulfill the following standards although perceived as suboptimal:

1) *„ecologically rational (i.e. they exploit structures of information in the environment),*
2) *founded in evolved psychological capacities such as memory and the perceptual system,*

3) *fast, frugal, and simple enough to operate effectively when time, knowledge, and computational force might be limited,*
4) *precise enough to be modeled computationally,*
5) *and powerful enough to model both good and poor reasoning"* (Goldstein and Gigerenzer, 2002, p.75).

Gigerenzer in cooperation with different researchers shows various empirical examples supporting this argumentation:

Firstly, for example, *recognition heuristic*[6] is perceived in the classical notion of heuristics and biases approach as too simplistic. However, Goldstein and Gigerenzer (2002) argue that its effectiveness depends on its *ecological rationality*, in other words, when non-/recognition distribution is highly relevant to the choice criterion, chances are good that the quickly available result will be reliable. Of course, authors admit that recognition heuristic is domain specific, that is, it is only relevant for domain where distribution of non-/recognition is systematic. Nevertheless, according to Goldstein and Gigerenzer (2002), since recognition memory is vast and highly retentive, there seems to be a good reason for employing this heuristic in certain specific choices.

Secondly, Gigerenzer and Goldstein (in Gigerenzer and Todd, 1999) show that also inferential heuristics, despite the fact that they involve limited information search instead of normatively optimal search for information until expected marginal costs of acquiring another piece of information exceeds its benefits, may be perceived as adaptive strategies. For instance *Minimalist heuristic*[7], *Take the last heuristic*[8], and *Take the best heuristic*[9] all make the non-

[6] A recognized object/piece of information etc. is taken for a more relevant for the choice criterion than an unrecognized object/piece of information etc. (Goldstein and Gigerenzer, 2002).
[7] If recognition heuristic fails, that is all objects are recognized, people randomly pick cues for making the choice. If, with respect to the randomly chosen cue, one of the objects of choice is indicated as positive and the others are not, then it is extrapolated onto the choice criterion. If it is

optimal *"mistake"* of not looking for further or conflicting information and more than one cue, and hence are written off as irrational (ibid.). However, Gigerenzer and Goldstein (in Gigerenzer and Todd, 1999) performed a comparison of these heuristics with optimal solution strategies only to find out, that these did not in fact outperform them on accuracy. Gigerenzer and Goldstein (in Gigerenzer and Todd, 1999) concluded that simplicity and promptness of these heuristics can go hand in hand with acceptable levels of accuracy in real-world environment and, therefore, are not to be perceived suboptimal or *"irrational"*.

Lastly, Gigerenzer (2005) criticizes the use of notions, such as invariance for example, to describe optimal decision making, derived from classical normative approach. According to Gigerenzer (2005), this principle implies that different representations of a decisional problem should yield the same result; hence neglecting the framing of the situation. However, Gigerenzer (2005) argues, that contextual information is relevant for the dynamics or history of a given situation and usually contains additional information for the decision-maker.

From this point of view, of course, it does not make sense to ignore possibly important situational information. Gigerenzer concludes: *„It is sufficient to say that the use of these logical rules as content-blind norms has led to the same problem: it eliminates the characteristics of human intelligence from the definition of good judgment. These include abilities that are yet unmatched by today's computer programs, such as inferring the meaning of polysemous terms*

found to be positive on the cue and criterion the choice is made (Gigerenzer and Goldstein in Gigerenzer and Todd, 1999).

[8] Similar to Minimalist heuristic, but the choice of cues is not random but based on "*einstellung*" described by Gestalt psychologists, e.g. people tend to pick the last strategy that worked first and derive a set of plausible cues based on previously successful cues (Gigerenzer and Goldstein in Gigerenzer and Todd, 1999).

[9] Again, similar to Minimalist heuristic but the choice of cue is based on their perceived validity. The most valid is taken into account first. Validity of cues can be genetically prepared or learned (Gigerenzer and Goldstein in Gigerenzer and Todd, 1999).

from the semantic context, and decoding information that is given "between the lines". As a consequence, we have learned next to nothing about the nature of thinking or other cognitive processes from research on content-blind norms [...]. Inappropriate norms are not simply a normative problem. They tend to suggest wrong questions, and the answers to these can generate more confusion than insight into the nature of human judgment." (Gigerenzer, 2005, p.14-5).

4 Exit decisions

In previous chapters it was argued that decision-making models, as conceptualized in classical economical theory of decision-making, did not manage to sufficiently explain, predict and interpret the empirical findings stemming mainly from psychological research. This chapter will focus on specific decisional situations – exits – and will apply the concepts suggested for decision-making in Prospect theory and Intuitive judgment approach, to this particular area of decision-making. The purpose of this section is to specify exit decisions, review economical approach to exits and the state of research on exits, and, finally, to apply theoretical concepts of Prospect theory and Intuitive judgment approach to exit decisions.

The author argues that exit decision-making, just like individual decision-making in general, can be expected to be influenced by the limitations of human cognitive processing capacity as well as limitations to rationality. Moreover, the author assumes that a large majority of real-life exit situations involve significant levels of uncertainty and are confined by limited information available to the decision maker. This assumption is due to the complexity of exit decisional situations humans encounter, which are more thoroughly specified in the following sections.

In other words, when making a decision, in this case an exit decision, people might act rationally, but only within the limitations of their subjective perceptions of the situation (Shepard in Shelly and Bryan, 1964; Simon, 1959 in Castles, Murray and Potter, 1971; Simon, 1969). To demonstrate this point, consider the following (source: www.dilbert.com, by Scott Adams, published on June 29th 2006):

There is no doubt about the rationality in the background of the employee's decision. However, in the so-to-say *"real"* or *"objective"* world the intra-psychological, let's say, emotional reaction to her manager could hardly be predicted.

In addition, as will be argued in section 4.2, the author assumes that exits are commonly made by individuals, and individuals are prone to make intuitive judgment "*errors*" (Gilovich and Griffin in Gilovich, Griffin and Kahneman, 2002; Sternberg, 2002). Therefore, heuristics and biases in cognitive processing are to be observed in the context of exits as well as in other decisional situations. This also means, that exits are hard to take on. As Thaler (1994) points out, status quo bias and escalation of commitment take a role in unsatisfactory information processing of decision makers, presumably sharpened by the sunk cost effect. Cognitive heuristics and biases are employed in order to facilitate the decision processes and are potentially leading to suboptimal decision-making process (Simon, 1969; Skořepa, 2005).

Nevertheless, as was pointed out earlier, the same *"errors"* may possibly help optimizing exit decision-making, just as any other decision, through acceleration of alternatives evaluation and the use of environmental structures (Gigerenzer and Goldstein, 1996; Goldstein and Gigerenzer, 2002). As in the case of the employee quitting her job, it can be assumed that she arrived at a

rather optimal decision given the circumstances. As the thoughts of killing her boss were so strong, there was no need to consider other alternatives, such as staying employed and going through with the murder. In other words, she did not need to thoroughly evaluate other alternatives and eventual outcomes to arrive at her, as the author believes, very good exit decision.

Before details of the decisional process and judgment distortions influencing exit decisions will be discussed, exit decisions and the essential decision maker's nature, as conceived in this thesis for the purposes of the empirical study, will be defined. Then, the approach to studying exits in economy is to be specified. After describing the exit decisional process and biases involved, the current situation in research on exits and relevant cases will be presented.

4.1 What are exit decisions

Exit decisions are a specific subset of decisions in general. The term *exit* is mostly referred to in the field of economics in the context of market entry and exit (Dixit, 1989; Murray, 1988; Schary, 1991). Obviously, market exit activities do involve important decisions, commonly referred to as exit decisions[10]. Through the influence of developments in behavioral economics, exit decisions, as examined in current literature (for instance Horn, Lovallo and Viguerie, 2006; Moon, 2001 etc.), happen to be defined in a somewhat broader sense, as decisions to exit not only a market or industry, but also business, a project etc (Horn, Lovallo and Viguerie, 2006). As Bornstein and Chapman put it: *„An unfortunate fact of life is that things frequently do not go as planned. Whatever the reason – poor planning, or mere bad luck – people must then decide whether to try something different or continue with their original plans"* (Bornstein and Chapman, 1995, p.251).

There does not seem to be a commonly agreed definition of what constitutes an exit decision in psychology, however ceasing time and money investments in various situations such as business decisions, evaluations of employees' performance or in competitive situations, are commonly examined in research concerning escalation of commitment under conditions when expected utility approach would suggest that exiting is more optimal than continuing (Bornstein and Chapman, 1995, p.251). As follows, for the purposes of this thesis, exit decisions shall be understood in a broader sense, extrapolating from the business context, as decisions to cease an activity, which required conscious

[10] Or Progress decisions occasionally (author's note).

entry and investment of resources[11] from the decision maker or from the organization[12] s/he represents.

Lack of a specific exit decision definition in psychological literature is probably due to the fact that exit decisions are not expected to involve specific psychological processes. However, the author believes, that there is a psychologically distinct subset of circumstances calling for various psychological processes contained in exit decisions. According to the author, exit decision-making processes form a coherent group that could be addressed and aided by examining commonly known psychological processes in this new context. It shall be argued, that exits compose a specific decisional situation characterized by a given time scope and including reorganization of the situational system after the exit decision is taken, versus continuing of status quo if exit is not to be taken. In other words, deciding to exit means deciding to change the current system's organization, context and situation, resulting in a new not entirely predictable consequent situation. This system change must clearly be specified within a time context, hence, as Moon states: *„Progress decisions as opposed to adoption decision, require a temporal element, including a specific beginning and end date"* (Moon, 2001, p.105).

Moreover, the old context and situation, the old system, requires investment of resources (such as time, money, effort but also trust, belief, hope, love and other) to be established and persevered. Therefore, decisions to exit from or persist in the old system leads to high levels of stress due to uncertainty and irreversibility of outcomes, and requires intense motivational changes in

[11] Under resources the author understands various forms of investment including time, money, effort, inclusive of elusive aspects such as trust, beliefs, feelings etc.
[12] An organization is understood as a group of people that pursues common goals or objectives (Olson, 1965 in Castles, Murray and Potter, 1971).

order to induce commitment to change the old system. In fact, Baird and Morrison (2001, p.361) argue, that value of exit decision decreases along with the uncertainty of future gains, e.g. if future profits are uncertain more patience is desirable, while if extent of gains is certain, the decision maker should be more ready to exit as gains will be increased through exiting. Hence, distinguishing exits from other decisions, the author argues, shall lead to unique practical implications.

As suggested above, exit is closely tied with entry, or more generally put: with *starting something new*. As soon as a person decides to end or exit an investment, whether it is a business or a relationship, s/he immediately enters a new, changed situation – a new system. For example, if a relationship is ended the person becomes single again, which involves to large extent unpredictable changes in everyday life of this individual. On the other hand, if a project is exited, the budget tied to continuing the project might be saved and new investments might be considered. Or there might be large losses from over-investing in a failing project leading to further cutbacks in other areas of the businessman's undertakings. The project manager who decides to exit the project might even find, that his career path and opportunities have changed due to this decision.

Therefore, exit decisions in real-life situations commonly involve significant levels of uncertainty regarding the outcomes and consequences for the complex intra- and interpersonal and/or market situation change arising after exiting. Besides, limited information is available for predicting the outcomes and consequences of exiting. Consider various situations of exiting:

1) Even in a rather structured or defined situation of exiting a business, approximations and estimates of the market's progress

in future are involved in taking this decision. Of course, the manager can never be entirely certain if sticking with the business could not eventually lead to higher earnings sometime in the future.

2) Also less structured or defined situations, where the profits cannon be reduced merely to financial profits and the approximation of probabilities of desirable outcomes are more or less subjective estimates, such as *"exiting*" a relationship or a job, involve even higher levels of uncertainty about the future outcomes of these decisions: will s/he ever find a partner/job that is a better fit for him or her? Will the person be happier in the new relationship/job?

This level of uncertainty is expected to result in heightened stress levels and requiring complex motivational changes in order to gain commitment of the decision maker for an exit decision. In other words, the nature of exit decision-making is such, that it includes large levels of uncertainty combined with a complex situation or system change, which often carries very high risks. Hence, exits are on principle stressful, evoke intrapersonal conflicts and require strong motivation for such drastic change in order for the exit to occur. This leads the author to believe, that cognitive mechanisms skewing correct information processing and decision-making that would result in exiting will be present in larger extent in exit decision-making.

Of course, exit decisions in more structured environments, such as business undertakings, involve both objectified optimized reasoning (usually supported by methods and techniques specified in economical science, or by managerial often computer-aided decisional systems) and individual judgments

and choices taken on by the CEO or other responsible manager respectively (Churchman and Eisenberg in Shelly and Bryan, 1964). Moreover, both in business environment and in day-to-day situations, such as break-ups or quitting a job, the social and interpersonal aspects influence the exit decision itself as well as the post-decisional situation (Vroom and Yetton, 1973). However, as will be more thoroughly discussed in the following section, this thesis and the accompanying research focus on the individual cognitive judgment processes, more specifically heuristics and biases playing role in exit decision-making, and disregard the social, intra- and interpersonal implications of exit decision-making. The author believes that this step, though over-simplifying the decisional situation, is desirable for the purposes of developing systematic psychological research on exit decisions specifically.

4.2 Who makes exit decisions

As mentioned above, exit decisions are usually considered in the context of business, but for the purposes of this thesis are extrapolated to commonly made decisions ranging from selling a business venture through quitting a job to ending a relationship. This thesis will focus on intuitive judgment processes of individual decision-makers making exit decisions in various contexts for two main reasons:

Firstly, as the definition in previous section suggests, most exit decisions in this wider sense are to be made by an individual decision-maker. The author believes that the same model as applied to individual day-to-day decisions can be expanded to decisions made in business context, mainly while the decisional authority is commonly aggregated in the hands of few individuals in current companies, who, in the hierarchical context, bear individual responsibilities. Nevertheless, organizational decisions are supposed to be guided mainly by organizational goals (Barnard, 1938 in Castles, Murray and Potter, 1971), although personal goals are also present (Thaler, 1994).

However, in specific cases, this approach has limited applicability, such cases involve organized decision-making groups; a common example is elections. Moreover, according to Vroom and Yetton (1973) decision-making in organizations differs from everyday decision-making in that it involves highly structured social processes in addition to intraindividual cognitive processes encompassing intuitive judgments and choices (Churchman and Eisenberg, in Shelly and Bryan, 1964; Barnard, 1938 in Castles, Murray and Potter, 1971). As mentioned in previous section, for the purposes of this thesis and the accompanying research, the author decided to disregard the social or inter-personal processes in order to elaborate on the study of individual judgment

processes involved in exit decision-making in particular while developing systematic psychological research of exit decisions specifically.

Secondly, this thesis consciously neglects inter-individual differences in decision-making abilities, assuming that experts or managers are prone to similar cognitive biases as general public. This approach is supported by research findings (for instance De Bondt and Thaler in Gilovich, Griffin and Kahneman, 2002; Koehler, Brenner and Griffin in Gilovich, Griffin and Kahneman, 2002; Roxburgh, 2003 etc.). Moreover, the implications of intuitive judgment findings are in line with the idea that cognitive biases and intuitive judgment strategies stem from general limitations of cognitive processing abilities as such (Simon, 1959 in Castles, Murray and Potter, 1971; Sternberg, 2002; Thagard, 2001).

In addition, further intrapersonal aspects influence decision-making processes in general, and exit decision-making in particular, which are to be disregarded as far as theoretical assumptions utilization in this thesis and the accompanying research are concerned. Those intrapersonal aspects involve the aforementioned stress and internal conflict, or more generally speaking emotional states of the decision maker, and motivation of the decision maker to undergo higher risk of changing the old system context.

For example positive affect may influence the effectiveness and exhaustiveness of reasoning and decision-making, thus influencing the extent of intuitive judgments and accompanying biases involved (Isen in Lewis and Haviland 1993). On the other hand, the effect emotional states have on decision-making depends highly on decision-maker's motivation as well as situational characteristics (Isen in Lewis and Haviland, 1993). For example, if the decision maker finds the problem important and/or interesting it can be expected that in connection with a mild positive affect, this situation will nourish higher levels of

creativity, and higher efficiency and thoroughness in decision-making (Isen in Lewis and Haviland, 1993).

Similarly, motivational influences such as anticipated regret or feelings of failure and responsibility, if a project or venture backfires and must be ceased; add to reluctance of the decision-maker to exit. As Wong and Kwong showed in their research: *„(a) escalation of commitment is stronger when the possibility of future regret about withdrawal is high than when this possibility is low […] and (b) escalation of commitment increases as the net anticipated regret about withdrawal increases […]. This research indicates that people in escalation situations are simultaneously influenced by the emotions they expect to experience in the future (e.g., anticipated regret) and by events that have happened in the past (e.g., responsibility for the initiating previous decision)"* (Wong and Kwong, 2007, p. 545). Moreover, external motivational factors, such as lower social status if relationship fails, or cut-downs on rewards or commissions if a business project is quit, or even impact on one's career if a venture discontinued, further amplify the reluctance and possibly also the extent of cognitive processing performed by the decision-maker.

To conclude, the author is aware of an extensive simplification of the decision situation in the sense, that certain inter-/intra-personal, situational and other factors involved and strongly influencing the context of decision-making and probably the process of decision-making as such are disregarded. In addition, individual differences in reasoning abilities are neglected assuming that cognitive biases occur throughout individual judgment. The author argues, that for the purposes of research on cognitive biases involved in exit-decisions this simplification can be taken on while exits do eventually involve the crucial situation, in which an individual is forced to make the decision to exit or continue

and take on responsibility for his or her decision using his/her limited cognitive processing capacity. Without doubt however, the social, inter- and intrapersonal context of exit decisions is an important aspect and shall be further elaborated in the future. It is an area that deserves attention, especially on the side of psychologists, as it is their domain more than the domain of behavioral economy, and also possibly a rich field for subsequent studies.

In summary, for the purposes of this thesis and the accompanying research, individual decision-makers (prone to intuitive judgment errors, mainly cognitive biases stemming from the nature of cognitive processing limitations) will be considered the main bearers of the decisional responsibility, and their individual judgments will be the focus of the accompanying research.

4.3 Can exit decisions be predicted by economists?

Economists view exit decisions in the context of business world as intertemporal choices to cease a venture or project, e.g. a decision to cease, which happens over a time period (Murray, 1988, p.333). Hence, exits are similarly specified in economy as in this thesis (see section 4.1), only economy emphasizes exit decisions done in economic context and mostly looks for ways to predict rather than understand exit decision-making. Hence, economic science is for most part evaluating the probability of exits and factors that influence and thereafter predict this probability. The purpose of economic research in the field of exit decision-making is therefore *"to be able to make predictions about behavior of organizations in the market"*. Various aspects were identified in economic science as relevant for the probability of exits, specifically size of the company and scope of sunk costs[13] (Murray, 1988, p. 343).

Statistically, it seems that larger companies tend to exit after a longer period of time since entering the market, than do smaller firms (Murray, 1988). Of course, the more diverse the company's portfolio, regardless of its size, the longer the firm can be expected to last on the market. In addition, besides other motivating factors, sunk costs play an important role. That is, the higher the sunk costs the longer the company remains on the market in an attempt to justify for these costs (Murray, 1988). According to Murray (1988), high sunk costs tend to evoke higher levels of aspiration as well as longer periods of declining revenues for the entrepreneur to consider exit.

This is strongly related to the nature of economical entry/exit decisions. Entry/exit decisions in the context of business venture display a feature referred

[13] Sunk costs are described in this context as costs required for market entry, that is the costs that are non-retrievable after entering the venture (Murray, 1988).

to as hysteresis (Dixit, 1989). Dixit (1989) defines hysteresis as failure to reverse an effect after the initial cause for the effect no longer holds. This means, that for example reasons for entering a market may soon pass, but the newly founded company will remain on the market, partially because of the sunk costs mentioned by Murray (1988), but also due to beliefs and aspirations of the entrepreneurs etc. (Murray, 1988). It seems that Murray (1988) came across one of the most important biases involved in exit decision-making known to psychologists and behavioral economists as the *Sunk cost fallacy*, further discussed in next section.

It is important to note, that up to this point various forms of exits were not distinguished. In business world however, different forms and strategies how to exit a business or a market are observed. Economists spotted that different exit strategies in business world are often correlated with differing contexts for the decision itself. Schary (1991) called attention to this aspect of exit decision-making.

According to Schary (1991), a firm's exit from an industry can take at least three forms: merger, voluntary liquidation and bankruptcy. Different forms of exits are associated with various consequences of the decision as well as different decision makers. While in merger the productive capacity of the firm is retained, in voluntary liquidation or bankruptcy it is not. Still, in voluntary liquidation at least the creditors of the company are paid. Therefore, mergers mostly involve equity-holders as decision-makers, whereas bankruptcy is usually in the hands of creditors (Schary, 1991, p.340-1).

It seemed that based on the situational factors and firm characteristics different forms of exit can be predicted, however, according to a preview made by Schary (1991) a sequence of decisions ranging from first merger offer to the

last creditors outcry for bankruptcy, is a more reliable source for exit form prediction than any company characteristics.

Hence, it seems that the form of exit is influenced by previous sequence of decisions taken. According to the classical concept of decision-making, such contamination of decision-making should not take part, instead, each decisional situation shall be evaluated separately striving for the optimal solution. So what is going on here? Is it possible, that cognitive processes or even biases on the side of the decision-maker are at play here, rather than the rational and optimal problem solving stemming from characteristics of the situation and the company?

To conclude: while economic science tended to study exits in terms of factors that allow predictions about exit behavior on the market, this short preview of economical findings shows, that the economical approach was failing to sufficiently specify aspects that lead to exit. Therefore, behavioral economists and psychologists joined their forces to explain exit decision-making through implications stemming from Prospect theory and intuitive judgment approach findings; their theoretical as well as research efforts are described in the following sections.

4.4 How are exit decisions done: Implications of Prospect theory and Intuitive judgment approach to exit decision-making

This section deals with the applications of theoretical findings stemming from theory and consecutive research on Prospect theory and Intuitive judgment into the area of exit decision-making.

According to Horn, Lovallo and Viguerie (2006, p.67) there are three main stages of exit decision-making, first comes the analysis of the project or investment status, be it monetary or other investment. Second is deciding to exit, and third is clarifying the conditions of exit. Each stage of exit decision-making is supposed to be influenced by relevant cognitive biases as described by Kahneman, Tversky and others (Gilovich, Griffin and Kahneman, 2002; Kahneman, Knetsch and Thaler, 1991; Sternberg, 2002 and others). Besides other psychological aspects[14] playing role in exit decision-making of organizations, these four cognitive biases are expected to affect exit decisions (Horn, Lovallo and Viguerie, 2006, p.67):

1. *confirmation bias*, which is expected to play the role of information corrupter in the stage of project evaluation and analysis;
2. *sunk cost fallacy*, which is responsible for reluctance to exit through factoring unrecoverable (sunk) costs inflicted when the project was first taken on (despite these are considered irrelevant for decision-making as far as optimal decision-making is concerned);

[14] Certainly, personality, emotional state, motivation, expertise and various situational factors may influence the process of exit decision-making. However, these factors will not be considered in this analysis of exit decision-making, which focuses on the cognitive heuristics and biases approach to understanding decision-making.

3. *escalation of commitment* is boosted by the previous biases including selective information intake and reluctance to incur sunk costs, and leads to further investments despite indicators of project's or venture's failure;
4. *anchoring of adjustment* corrupts the appraisals of possible gains from exit or required investment to continue by an initial value, that may arise through various and often unrelated estimations, for example the price offered for the company by last interested buyer (usually before its depreciation).

These biases are strongly interlinked, the sunk cost fallacy can even be attributed to the effect of anchoring, stating that anchoring the expenses on 1 000 makes a further 100 seem irrelevant (Roxburgh, 2003, p.11). However, the fundamental nature of loss aversion/ risk seeking identified by Kahneman and Tversky's Prospect theory (1979) provides another strong explanation: It seems that people would prefer to spend further 100 when they face the decision to loose the 1 000 they already invested (Roxburgh, 2003, p.11). In other words, through the work of the above-mentioned risk preferences, exit decisions are encumbered by perceived losses certainly incurred, despite the fact that these shall not be taken into account as they are 'sunk' or already lost if you will, along with prospects of gains projected into future with higher than realistic probabilities. According to Prospect theory's value function, it seems that the set of options twisted by heuristics and biases at play in exiting can be simplified as follows:

1) writing off sunk costs be it money or other investments (certain loss) and move on,
2) make further investments and at least subjectively have chances of succeeding (possible gain),

clearly, 2) is the preferred choice as in order to avoid a loss people can act in a risk-seeking manner. Moreover, overoptimism along with confirmation bias and endowment effect will promote overestimation of subjective probability of success. Moreover, through sunk cost effect and anchoring the further investment's extent can be exaggeratedly distorted.

To conclude, cognitive biases along with the phenomena of loss aversion/ risk seeking and endowment effect observed in intuitive judgments and predicted by Prospect theory seem to contribute to the *reluctance* of organizations, especially their representative decision-maker's *to exit* (Roxburgh, 2003, p.12), and, as was argued, also of individuals in personal exit decisions (Arkes and Blumer, 1985).

4.5 Research efforts on exit decisions in business context

Research seems to support the expectations that companies do indeed exit the market or project at all the wrong moments. For instance one survey showed that companies tend to exit market at the lows of the business cycles, as the authors add, usually the worst possible time (Horn, Lovallo and Viguerie, 2006). Moreover, according to analysis, it seems that failing businesses barely have a chance to manage to grow significantly in the following three years (Horn, Lovallo and Viguerie, 2006), however, they do not manage to exit in time to make profit.

For instance, the case of the US beer maker Joseph Schlitz Brewing can be considered. According to Horn, Lovallo and Viguerie (2006) the company decided to change their brewing process in early 1970s, in order to decrease costs. However, the market immediately signaled strong disapproval: the sales were low and customers were dissatisfied with the new beer. The company continued the new strategy, went into decline and was then acquired by its rival.

Also individual biases involved in exit decision-making are well documented in cases from the business environment. For instance the sunk-cost effect was observed in financial institutions facing decisions over large IT projects (Roxburgh, 2003). One of the more public cases was the London Stock Exchange and its attempt to build an automated-settlement system (Taurus). Despite the obvious failure of the project, decision-makers kept investing. In the end, *„It took the intervention of the Bank of England to force a cancellation, write off the expenses, and take control of building a replacement"* (Roxburgh, 2003, p.10).

Next example of the sunk-cost fallacy is from the equity business. In recent years certain European financial institutions started building their equity

portfolios, investing large sums into this area. However, soon it turned out they cannot compete with equity specialists such as Goldman Sachs or Merrill Lynch. Some banks wrote the expenses off and moved on, others are still said to be *„caught in the trap"* (Roxburgh, 2003, p.11).

Another good example was the Vancouver Expo 86 project. With budget for 78 million Canadian dollars in 1978, the Vancouver Expo 86 ended up costing an incredible 1.5 billion by 1985 with a deficit of 300 million thanks to the committed decision-makers in the government.

To summarize, it seems that there exist real cases in the economical context that support the proposition, that companies are indeed prone to the heuristics and biases that are expected to influence exit decisions. The author believes that similar cases can be found in day-to-day personal exit decision-making. The following parts of this thesis will attempt to show that this is indeed the case.

4.6 Research efforts on exit decisions in psychology

As was mentioned before, in psychology the term exit decisions was not yet fully defined and separated from decisions in general, although, as was previously argued, such temporal decisions seem to involve specific characteristics and hence a specific set of heuristics involved. These specific heuristics typical for decisions to exit or continue after a period of previous investments (be it monetary, time or other) mainly sunk costs fallacy and escalation of commitment specific for these temporal exit/continue decisions, have, nevertheless, been studied by psychologists and behavioral economists.

Sunk cost fallacy, to start with, was widely examined. One research that gained strong support for the sunk cost effect was done by Garland and Newport (1991). Their research was based on a decision scenario, which asked subjects to estimate the probability with which they would assign the remaining budget to a commenced project stemming from 1 to 9 million remaining funds given a 10-90% completion of the project (Garland and Newport, 1991). Seemingly, Garland and Newport found strong sunk cost effect, but as Garland (1990) argues, it may have been the effect of incremental costs rather than of the sunk costs. Therefore Garland (1990) repeated the experiment in an adjusted form: Garland separated sunk costs from incremental costs and added estimation of probability of project success as a dependent variable. Garland's (1990) analysis showed strong effect for sunk costs but not for the incremental costs and subjective probability of profit, hence suggesting that these factors did not contribute to observed level of investment.

Further research was conducted by Bornstein and Chapman (1995). They conducted three experiments to explore, in the wake of Gigerenzer's criticism, whether heuristics may indeed result in higher effectiveness as well as optimality.

All three experiments involved scenarios with four continuation responses and one *"switch to a better alternative"* option for the participants to choose from (Bornstein and Chapman, 1995). Each experiment also manipulated one of the factors influencing attractiveness of options, mainly possible positive outcomes and personal responsibility perceptions (Bornstein and Chapman, 1995). As it turned out, although sunk costs did seem to have lead to further investment, other reasons such as learning a lesson for instance were found to further enhance this effect, hence: other reasons apart from the sunk cost fallacy seem to play a role (Bornstein and Chapman, 1995).

As follows, research suggests that sunk cost fallacy does indeed escalate commitment, although other factors, rational and irrational may be at play as well. Moon (2001) was looking at this escalation of commitment effect inflicted by sunk cost fallacy in interaction with need to complete represented also by what is referred to as Zeigarnik effect[15]. According to Moon (2001) *sunk cost effect* and *need to complete* are often confounded in research on escalation of commitment. Moon (2001) argues that while sunk costs *push* decision makers to continue in order not to appear wasteful, the need-to-complete in the same time *pulls* them in the same direction.

Similarly to previously mentioned studies on sunk cost fallacy, Moon (2001) used a decisional scenario varying the sunk costs and level of completion, asking respondents to evaluate the probability, with which they would continue to invest in this project. Moon (2001) was the first to find effect of both sunk costs and completion effect and their interaction, suggesting that entrapment (high sunk costs and high completion) contributes to escalating commitment effect.

[15] Zeigarnik effect, simply put, is a tendency to remember uncompleted tasks better then completed tasks (Wikipedia, 2007 d)).

McCain (1986), on the other hand, seems to argue, that escalation of commitment is not as straightforward as would be expected. In fact, he noted that de-escalation follows escalation when a financial investment is failing. Garland and Sandefur (1990) conducted three experiments to examine how negative feedback interacts with sunk costs in escalation of commitment to continue or, on the other hand, decision to exit in a petroleum exploration venture. Their results contradicted previous findings on sunk cost effect. In fact, the higher the sunk costs leading to failure (number of dry wells) the less likely geologists seemed to be to invest further and the lower their estimates of potential profit from further investment (Garland and Sandefur, 1990). In other words, previous failures in research by Garland and Sandefur (1990) lead to de-escalation of commitment through reversing the extensive sunk cost effect.

To summarize, heuristics and biases specific for continuation/exit decision-making, namely *sunk cost fallacy* and *escalation of commitment*, as it seems, have been extensively studied. The evidence, however, is not as clear as one would imagine given those are supposed to be well-established effects. Sunk cost, although often confirmed in experiments and playing a role in escalating commitment to a venture, does not seem to be clearly distinguished from other factors playing role such as different rational reasons for commitment (wish to learn a lesson for example) as well as need to complete. Moreover, escalation of commitment, despite strong evidence for this effect, is also not as general as previously supposed, in fact, negative feedback, or failure if you wish, hinders escalation and can even lead to a counter effect: de-escalation of commitment.

4.7 Conclusion

In this chapter exits were defined as decisions to cease investing in a broader than financial sense of this term. It was argued, that such exits are common situations in everyday life of an individual decision-maker as well as in decisions taken on by corporations. However, research approach taken to exits in economy, from where this term was lent, did not seem to result in understanding and predicting the actual exit decision-making. Based on the nature of decision-making in organizations, it was proposed, that organizational decisions involving possibility of exit are also, in the end, taken on by individual decision-makers. Hence, the hypotheses about individual decision-making behavior stemming from Prospect theory and Intuitive judgment approach could have been applied. The interaction of loss-aversion/risk-seeking according to Prospect theory's value function and of main psychological heuristics and biases, which are hypothesized to play a role in exit decisions, were described.

Biases specific for continue/exit decision-making, namely *sunk cost fallacy* and *escalation of commitment*, were researched by psychologists and behavioral economists. Although both effects are considered well established, a short preview of research work in this area proved to be equivocal in findings. While *sunk cost fallacy* seems to be the crucial bias and theoretically the basis for *escalation of commitment effect* present in exit decision-making, and while research in this area displays conflicting evidence, the author decided to explore the *sunk cost effect* in experimental conditions. The research conducted in an attempt to examine *sunk cost fallacy* is described in the empirical section of this thesis.

II. Empirical part

5 Introduction

5.1 Theoretical summary

Research showed that once previous investments, be it money, time, or effort, have been incurred, people tend to stick with the endeavor (personal or business), taking the previous investments into account when considering whether to continue or exit (Arkes and Blumer, 1985, p.124). This phenomenon is known as the *sunk cost effect*, or *"throwing good money after bad"*, and is considered normatively unjustified while, according to expected utility approach, sunk costs are irrelevant for current utility of an option (Johnstone, 2000).

Nevertheless, sunk cost phenomenon, the author argues, seems to be in line with Value function proposed by Kahneman and Tversky (1979): sunk costs, according to the author, are potential losses that will have to be certainly incurred if exit or cancellation of an endeavor is to be taken on. Hence, sunk costs take on the role of a loss, which releases risk-seeking tendency in a decision-maker, allowing sunk cost fallacy to be a medium for *escalation of commitment effect* found in temporal decisional situations calling for reconsideration of further investment. Other explanations were used to account for sunk cost effect, most commonly decision-maker's unwillingness to appear wasteful (Arkes and Blumer, 1985), information processing bias (Whyte, 1986), and other (Garland, 1990).

However, as studies discussed in section 4.6 revealed, there remain to be confounding factors influencing both the sunk cost and the respective escalation of commitment effect such as negative feedback (failure if you like), which was shown to lead to de-escalation as opposed to escalation of commitment (Garland and Sandefur, 1990). Also Heath (1995) found that escalation of commitment is

neither general nor constant and depends on additional factors. Two main reasons for *"sticking too long"* were suggested: a) *"mental budget"* was not imposed and b) aggregate expenses were not accounted (Johnstone, 2000, p.3). In fact, Heath found a tendency to de-escalate commitment, even to de-escalate too readily, when spending limits were self-imposed (Heath, 1995, p.53), resulting in what Johnstone (2000) refers to as *"reverse sunk cost effect"*, e.g. the higher the level of sunk costs, the lower the tendency to invest further.

Another interesting factor – completion effect – was suggested to influence research on sunk cost fallacy. Garland and Conlon (1998) pointed out that the social desirability along with Zeigarnik effect[16], also force the decision maker to finish what s/he started, hence enhancing escalation to commitment. However, Moon (2001) suggests that need for completion is usually not isolated in sunk costs effect research. He found a synergic interaction effect between completion and sunk costs, the first pulling and the second pushing the decision maker towards escalation of commitment (Moon, 2001).

Given these findings, the author has conducted a research based on a newly developed decisional scenario describing a personal decision, testing for the presence of sunk cost effect. According to suggestions made by Heath (1995) and Johnstone (2000), an approximate mental budget has been introduced in Main study, while sunk costs were varied, in order to observe whether an escalating or de-escalating effect will take place or possibly a combination of these effects will take place. The research has two parts, the Pilot study, dedicated to scenario development and Main study exploring the effect of sunk costs given a mental budget. Two types of investments were studied: money and time. Details of the research design are described in section 5.3.

[16] See footnote no.15. on page 63

5.2 Methodological issues

Before describing the design of the conducted research, the author would like to comment on methodological issues research in this area encounters.

As suggested, the realms of financial decision-making and similar were excessively studied and also well documented (De Bondt and Thaler, 1994; Mullainathan and Thaler, 2000). Most research on decision-making in psychology and in behavioral economics, however, was based on case studies or laboratory experiments. The first, case studies, were usually taken from real life and interpreted according to theoretical assumptions. The second is most commonly based on respondents' presumptions about their reactions to hypothetical decisional scenarios. Such simulations are used mainly because introspective interviews are not a good source of data, while intuitive judgments mostly involve unconscious automatic processes (Kahneman and Frederick in Holyoak and Morrison, 2005).

Although these research approaches provided large amounts of data and are very economical, they have major shortcomings: while laboratory experiments tend to have low ecological validity and uncertain reliability of findings, case studies involve an excessive amount of confounding variables, that may impair interpretations. Surely, as far methodology is concerned, real decision experiments would certainly be the most credible method to be employed when searching for evidence for a theory, however, they require extensive resources (Ferjenčík, 2000).

Due to limited resources, research conducted as a part of this thesis is also based on a simulated decisional scenario, asking respondents for hypothetical decisions. In order to allow for wider ranging generalization of findings, author decided to develop a personal decision scenario. The author is

aware of limitations to this approach: besides the problems with ecological validity, the jeopardy of creating a new scenario that would sufficiently elicit the (reverse) sunk cost effect, and (de-)escalation of commitment respectively (Staw, 1997, p.211). Therefore, this research was conducted in two phases: Pilot study was conducted to test the effects of two variants of newly developed decisional scenario; following Main study looked at the effects of varying sunk costs as the independent variable given a certain mental budget in two types of investments: time and money. Details of research design are discussed in the following section.

5.3 Research design

As already mentioned, the following research is based on an experimental design, using hypothetical decisional situation with varying sunk costs incurred as the independent variable and registering the investment decisions of participants as dependent variable. Research focuses on three main questions:

1) Do sunk costs, in fact, cause lower or higher rates of exiting (through de-/escalation of commitment)?
2) Does the (reverse) sunk cost effect translate to different investments (in this case money or time investment)?
3) How does the level of sunk costs influence the extent of investments and respective (de-)escalation of commitment?

The question of sunk cost effect is investigated through a hypothetical exit decisional situation. Two aspects of participants' decisions are registered: 1) whether participants choose to exit or invest further; and 2) the level of willingness to invest (that is the amount of money or extent of time participants are willing to pay/devote).

The incentive decisional situation was developed for the purposes of this study. It was specifically decided that a common personal decisional situation that is easily accessible and conceivable for respondents was chosen. Namely a choice of investing into a language course/exam in order to improve one's chances to get one of two job opportunities specified in the scenario.

Personal, common, accessible and conceivable were four main characteristics the author had in mind when developing the scenario for methodological as well as research reasons, while these characteristics would presumably enhance motivation of the respondent and comprehensibility of the

method as well as its face validity. In order to fulfill these characteristics, the author chose a job search situation, which she believes is very common and accessible for potential respondents, whether experienced personally or through someone else. Similarly, respondents were asked to decide whether to take a language course/exam, which the author considers a conceivable and common situation. Moreover, as the respondent him-/herself was put into the shoes of a job-seeker, the author believes, makes this a very personal matter, assuming each respondent is not an extreme fluctuant, but rather values a suitable and lasting job opportunity.

The pilot version was presented to participants in a paper-pencil form and was followed by open questions focusing on the main factors involved in exit decision-making. From the qualitative questions, the factors influencing their decision-making were derived, which were then used to adjust the research method. Details of research methods employed are described for Pilot study and for Main study separately in sections dealing with Materials.

The Pilot study incentive decisional situation was presented to smaller groups of students in two forms: with zero sunk costs and with mediocre sunk costs operationalized as financial investments (e.g. if so, how much are they willing to pay for a language course). The groups are listed in Table 1 below:

Table 1: Sunk cost groups

	Control condition	Experimental condition
Money	CZK 0	CZK 9,000

Mediocre sunk costs were approximated based on an on-line market research the author done in advance to the Pilot study on language courses and exams, evaluating their prices, length and perceived quality. The author evaluated various language courses and exam offers (data was derived from

www.jazykovky.cz), and approximated the percentiles for length and price found for standard quality courses, and used these values as input for research. The results are shown Table 2 below:

Table 2: Descriptive data and percentile distributions in language courses

		Course length (in hours)	Course price (in CZK)
N	Valid	77	77
	Missing	0	0
Mean		114.175	6 828.300
Median		51	4 641
Minimum		4	1 200
Maximum		810	29 000
Percentiles	25	31.6	5 940
	50	75.8	9 341
	75	108	12 462

Students were assigned a variant on a random basis. After exposure to experimental situation and recording their decision, groups answered open questions concerning core information influencing their decision-making in this hypothetical situation.

The resulting levels of investing in the two conditions and the rates of exiting were then analyzed and statistically evaluated, besides descriptive statistics, inferential methods were used (namely nonparametric Chi-Square to compare groups for the rates of exit, and two independent samples T-Test comparing groups for the rates of investment). From open questions, qualitative data were grouped, according to what piece of information they addressed, and frequencies were registered. Main factors influencing respondent's decision-making were considered and, when appropriate, adjusted in the research method to eliminate their confounding effects.

Secondly, Main research repeated the Pilot with a modified scenario and added experimental groups. It was launched on-line. The sample was gathered

through snowballing and was expanded in comparison with Pilot study to further explore the effects of sunk costs, as well as to monitor its possible generalization to time investments. Thanks to the larger sample, more experimental groups were used in addition to the control conditions (control condition scenario involved zero sunk costs). Three levels of either financial or time sunk costs were used resulting in six experimental and two control groups as depicted in Table 3:

Table 3: Sunk cost groups

	Control conditions	Experimental conditions		
Time	0 hours	1 week (36 hours)	2 weeks (72 hours)	3 weeks (108 hours)
Money	CZK 0	CZK 6,000	CZK 9,000	CZK 12,000

The levels of sunk costs were derived from the on-line market research done on Language courses and exams mentioned previously (see Table 3 above).

Statistical comparison between conditions of willingness to invest as well as level of investing was generated. Frequencies were assessed using Chi-Square and mean investment differences between groups were evaluated using Analysis of variance and T-tests. In order to explore the relation between the levels of sunk costs and the level of investments correlations of these variables were calculated.

6 Pilot study: Sunk cost effect in willingness to exit

6.1 Methods

6.1.1 Hypotheses

Firstly, the willingness to continue investing is evaluated.

H_{01}: Participants will not take financial sunk costs into account and will be willing to exit or continue investing equally despite whether sunk cost were or were not incurred.

H_{A1}: When presented with financial sunk costs of a decision, participants will be willing to either continue or exit more readily then when no sunk costs were incurred.

Alternative hypothesis is stated in ambidextrous fashion, while either escalation or de-escalation of commitment can occur, resulting from regular or reverse sunk cost effect.

Secondly, the mean values of investments are compared, in order to decide whether the level of investment is on average different and hence influenced by the presence of sunk costs:

H_{02}: There will be no difference in mean monetary investments between different monetary sunk cost level groups.

H_{A2}: There will be a difference between the mean monetary heights of investments for the different monetary sunk cost level groups.

6.1.2 Measures

Independent variable, the level of sunk costs, had two levels: zero and mediocre (9 000 CZK). Two dependent variables were registered, willingness to continue or exit (whether the participant decided to invest in a language course or not) and the level of investment, which was open for respondents to fill in an arbitrary sum of money.

6.1.3 Sample

In both Phase A and Phase B subjects were University students or teachers. Phase A involved altogether 32 subjects, of which 25 were female and 7 were male, ages stemmed from 19 to 46 with a mean of approximately 25 years. Of these 32 respondents, 18 were randomly assigned to experimental group (9 000 CZK in sunk costs already incurred) and 14 to control group (zero sunk costs).

Phase B involved altogether 21 subjects, of which 16 were female and 5 were male, ages stemmed from 18 to 26 with a mean of approximately 21 years. Of these 21 respondents, 10 were randomly assigned to experimental group (9 000 CZK in sunk costs already incurred) and 11 to control group (zero sunk costs).

6.1.4 Materials

In both phases A and B subjects received a decisional scenario describing a hypothetical situation. The scenario stated that they are currently seeking new employment and found two plausible prospects. In order to increase their chances to acquire the second job opportunity they need to invest in their language education, however, if they indeed succeed the company will reimburse

their investment. The question was whether, and if so, how much would they invest. In control condition no sunk costs were incurred, in experimental condition mediocre (9 000 CZK) has already been incurred in language education. The amount 9 000 CZK has been chosen as a mediocre sunk cost value, while it is an approximated market price for a language course of medium length in the Czech Republic based on a small market survey (see section 5.3 for details).

After participants decided whether and eventually how much to invest, two open questions were presented: first asking about key information that lead subjects to their decision, and second asking about what information would change their decision. Space was allocated to write down other notes or to ask explanatory questions.

The core difference in Phase A and B lied in the form of the scenario presented. More specifically, after evaluating qualitative data from Phase A, information that seemed to work in a leading manner was eliminated from the scenario. Information that seemed to work as expected or not in a disruptive manner remained the same. For both experimental and control versions of scenarios from Phase A and B see Appendix 1.

In Phase A the scenario stated that the respondent is looking for a job for 6 weeks, still has available financial resources not further specified, and has two job opportunities. For the first job, which is suitable for him/her, s/he is one of three final candidates, for the second job, which is more desirable in all respects, s/he is one of five candidates, but in order to get the job s/he must take a language course. If s/he will get the job, this employer will reimburse fees for the course. In control condition zero sunk costs were incurred, whereas in experimental condition mediocre sunk costs (9 000 CZK) were incurred for a previous language course.

In Phase B, the circumstances of the scenario remained the same, as they only rendered mediocre values in the qualitative data. This is the case for the financial situation, course attributes and usefulness (which remained unspecified), and chances to get either of the offers and the conditions of reimbursement for participating in the language course. One and only crucial change has been done to the scenario: the second job option has been presented as equally desirable as the first job option (as opposed to more desirable second job option in all respects – wage and workload – which has been the case in Phase A scenario).

Further changes were done to the experimental method for Main study, which are described in section 7.1.3.

6.1.5 Procedure

In both phases subjects were asked, as a part of their class work, to fill in the scenario in the paper-pencil based form. The experimenter explained that the experiment focuses on individual decision-making and is a part of her thesis. Subjects decided freely whether to take part in the research and were then randomly assigned either to experimental or control group. A short description of the purpose of the experiment was provided in writing before the decisional scenario and respondents were asked to carefully read the scenario and put oneself in the situation presented.

On the basis of the scenario, participants were asked to answer whether they would invest further and if so, how much (in Pilot study participants were not given choices but could decide freely how much they would be willing to invest). Scenarios did not include any mental budget and, both control and experimental condition versions for Phase A and B are provided in full in Appendix 1. After

taking their decision on the investment based on the scenario, the experimenter asked subjects to fill in open questions regarding key information crucial to their decision-making. When all were finished, a group discussion concerning the research and its methods lasting on average cca.15 minutes was opened.

6.2 Results

6.2.1 Phase A

Descriptive data were obtained for the level of exiting and for the mean levels of investment in both control and experimental groups. As can be seen in Table 4 below, there was a strong preference for continuation (91% of respondents) as opposed to exit (9% of participants), in both control and experimental conditions, suggesting there will not be observed a sunk cost effect on the levels of exit, while no apparent difference seems to exist between the two groups.

Table 4: Frequency of exit and continuation in research groups

		Version		Total
		Sunk costs (9 000 CZK)	Zero sunk costs	
Choice	Continue	16 (89%)	13 (93%)	29 (91%)
	Exit	2 (11%)	1 (7%)	3 (9%)
Total		18 (100%)	14 (100%)	32 (100%)

Using the Chi-Square test, these data were tested for significance levels. As results show, the miniscule differences were not statistically significant, that is $p>0,05$ (for exact values of Chi-Square Tests see Table 17 in Appendix 4).

Similarly, as Table 5 shows, the mean investments made in control and experimental conditions are also very similar, implying a negligible difference between investments in case of zero and mediocre sunk costs.

Table 5: Mean values of investments within groups

	Version	N	Mean	Std. Deviation	Std. Error Mean
Investment	Sunk costs (9 000 CZK)	18	8,111.11	4,788.330	1,128.620
	Zero sunk costs	12	8,708.33	6,151.343	1,775.740

Nevertheless, the mean differences were tested for significance using a two independent samples T-Test, which showed no significant differences in either direction in mean values of investments made in zero sunk cost and non-

zero sunk cost groups, e.g. p>0,05 (see Table 18 in Appendix 4). In other words, hypotheses H_{A1} and H_{A2} were refuted: no significant difference in willingness to exit/continue or in mean investments was observed between groups.

While neither exits nor mean investments seem to be shaped by the independent variable – sunk costs – the question arises: What exactly plays the major role in respondents' decisions? The answer to this question was provided by the participants themselves. Seven clusters were derived from qualitative data provided in the open questions based on the factor participants were addressing. Those seven clusters are presented in Table 6 below along with the frequencies of their occurrence as *key* information for the decision taken, core information for *changing* that decision, and *total* frequency of occurrence.

Table 6: Frequencies of clustered qualitative data

a.	Phase A		
	Key	**Change**	**Total**
Attractiveness of the 2. offer	23	12	*25*
i. Subject's financial situation	5	7	*12*
Course attributes	0	10	*10*
Course usefulness	10	0	*10*
Chances to get one of the offers	3	6	*9*
Reimbursement for the course	5	2	*7*
Other	4	8	*12*

To summarize, in Phase A no significant differences were observed neither in the tendency to exit nor in the level of investment between control and experimental conditions. In fact, both were strongly shifted towards strong commitment to the second job offer, hence, only negligible number of participants decided to exit the job selection process by not investing into the language course. Thus, both alternative hypotheses were refuted, null hypotheses were confirmed.

Nevertheless, as was seen in Table 6, the single most important piece of information in the Phase A scenario seemed to be the attractiveness of the second offer. While the second offer was presented as more attractive in all respects compared to the first job offer in the scenario, these results suggest it twisted decisions made by participants markedly towards continuing as opposed to exiting in both zero and non-zero sunk cost groups. Therefore, for the purposes of Phase B changes in the scenario were made accounting for equal attractiveness of both job offers described in the scenario.

6.2.2 Phase B

Data describing the results of Phase B of the Pilot study are shown in Table 7 below.

Table 7: Frequencies of continue/exit decisions in research groups

		Version		Total
		Sunk costs (9 000 CZK)	Zero sunk costs	
Choice	Continue	4 (40%)	9 (82%)	13 (62%)
	Exit	6 (60%)	2 (18%)	8 (38%)
Total		10 (100%)	11 (100%)	21 (100%)

The data suggest an opposite tendency for exits in the two groups, while in zero sunk cost condition participants tend to continue (82%), when sunk costs of 9 000 CZK are incurred, subjects exit more readily (60%). This difference was tested for statistical significance using the Chi-Square test. The results indicate the difference observed is significant on level $p<0.05$ (for Chi-Square Test results see Table 19 in Appendix 4), which suggests the effect of sunk costs is present, but works in reverse direction, thus resulting in de-escalation of commitment (hence, H_{A1} was supported while null hypothesis was rejected).

Table 8 below depicts the means of the investments taken on by the two groups. While valid investment data is missing for three participants, the group means are considered only for 9 subjects in each group.

Table 8: Mean values of investments within groups

	Version	N	Mean	Std. Deviation	Std. Error Mean
Investment	Sunk costs (9 000 CZK)	9	1555,556	2455,153	818,384
	Zero sunk costs	9	10555,556	7584,707	2528,236

There seems to be a large difference in the means of both groups, while 9 000 CZK sunk costs group has markedly lower mean of investments (difference in mean investments reaches 9 000 CZK). This would suggest that incurring previous (sunk) costs decreases subjects' willingness to continue investing. Hence, sunk costs seem to de-escalate commitment to the second job option. As the results of independent samples T-Test show, this effect is significant on $p<0,01$ level of significance (see Table 20 in Appendix 4). In other words, subjects were significantly more willing to invest into a language course if they have not previously invested in one (hence, H_{A2} was supported while null hypothesis was rejected).

Table 9: Frequencies of clustered qualitative data

	Phase B		
	Key	**Change**	**Total**
Attractiveness of the 2. offer	5	10	*15*
Subject's financial situation	8	7	*15*
Course attributes	2	10	*12*
Course usefulness	10		*10*
Chances to get one of the offers	11	6	*17*
Reimbursement for the course	2	3	*5*
Other	8	11	*19*

In order to understand these occurrences qualitative data are employed. Same seven clusters as in Phase A were derived from qualitative data provided in open questions, based on the factors participants were addressing. Those

seven clusters are presented in Table 9 above, along with the frequencies of their occurrence as *key* information for the decision taken, core information for *changing* that decision, and *total* frequency of occurrence.

In line with the qualitative results shown in Table 9, the second job offer was not more desirable as in the case of Phase A of the Pilot study, and, therefore, there was no sufficient incentive for participants to invest further in language courses when sunk costs were incurred. As it appears, in this case sunk costs worked as a repelling circumstance in their decision, resulting in what can be described as reverse sunk cost effect eventuating in respondents' de-escalation of commitment.

To summarize, Phase B resulted in significant difference in exit/continuation in the direction, that participants were more prone to exit if sunk costs were presented. When considered from the point of investment, operationalizing exit as zero investment, the mean difference between control and experimental groups was significant ($p<0,01$), suggesting there has indeed been a twist due to sunk costs to de-escalation of participants' commitment.

In other words, if sunk costs for a language course have already been incurred, and the second job option was not more attractive than the first, subjects perceived the second language course requested for applicability for the second job option, less desirable than when no previous course was taken. It seems, and is in accord with the qualitative data from Table 9, that usefulness and attributes of the course, along with chances to get the offer, have leveled importance as factors of decision-making with attractiveness of the second job option.

6.3 Discussion

The findings of the Pilot study are crucial for developing the method for Main study. As Phase A showed, any contextual or informational factor may result in what can be described as unsatisfactory incitation of the studied effect, namely the (reversed) sunk cost and (de-)escalation of commitment effects. Therefore, it is encouraging to see that reversed sunk cost effect took place in the Phase B of the Pilot study. In other words, thanks to eliminating confounding attractiveness of the second job offer described in research scenario, participants in Phase B were less prone to continue investing into language education, the more so if previous investments were already made. Significant results suggest this newly developed scenario has potential for eliciting the effects the author set out to examine.

Nevertheless, Pilot study and its methods have limitations. Firstly, students sample, and a completely new and relatively simple scenario were used. One concern is whether the scenario provided rich enough context to be considered realistic and provide validity transcending Pilot Study. Did the scenario elicit commitment to the choice to incur sunk costs stated in experimental group, was the previous investment perceived as sunk costs, what would the results look like if different probabilities were given to the two job options?

These concerns constrain the generalization of findings from Phase B. Moreover, although reversed sunk costs effect seemed to be triggered by the Phase B scenario due to undesirability of two language education investments, the question remains open, whether the same would be true if other investments were used such as language course and a following exam rather than two language courses in the sunk cost group.

Of course, large portion of these concerns would be eliminated if a previously tested scenario has been used. However, the author believes developing this new method is desirable for three reasons:

1) It repeatedly tests the suggestion that (reverse) sunk cost and (de-)escalation of commitment effects can be found in personal decisions
2) It is flexible enough to enable the author to test two types of choices in the following research: monetary and time investments
3) The context also allows, the author argues, finding a constellation triggering escalation rather than de-escalation of commitment (sunk cost effect, rather than reverse sunk cost effect). Hence, facilitating detection of factors and their relations in initiating these effects in either direction.

Fortunately, some of the concerns mentioned above can be addressed in the following study. Changes in the scenario will be discussed in section 7.1.3. Nevertheless, further research will be required in order to capitalize the potential of a newly developed heuristic and biases incentive scenario.

7 Main study: Impact of sunk costs on willingness to invest

7.1 Methods

7.1.1 Hypotheses

Similarly to Pilot study, the tendency to exit or continue (frequency of exit vs. frequency of continuation is compared) in zero sunk cost group as opposed to the various sunk cost groups and statistically evaluated:

H_{01}: Participants will not take financial sunk costs into account and will be willing to exit or continue investing equally despite whether and what level of sunk cost was incurred.

H_{A1}: When presented with financial sunk costs of a decision, participants will tend to either continue or exit more readily the higher the sunk costs then when no sunk costs were incurred.

In addition, the same hypotheses are statistically evaluated for conditions with time investments as opposed to monetary investments:

H_{02}: Participants will not take sunk costs in terms of time into account and will be willing to exit or over-invest equally despite whether and what level of sunk cost was incurred.

H_{A2}: When presented with sunk costs of a decision in terms of time, participants will tend to either continue or exit more readily the higher the sunk costs then when no sunk costs were incurred.

Alternative hypotheses are stated in ambidextrous fashion, while either escalation or de-escalation of commitment can occur, resulting from regular or reverse sunk cost effect.

Secondly, mean investment differences between different sunk cost groups are compared, in order to decide whether the level of investment is on average different for different levels of sunk costs and hence influenced by the level of sunk costs:

H_{03}: There will be no difference in mean monetary investments between different monetary sunk cost level groups.

H_{A3}: There will be a difference between the mean monetary heights of investments for the different monetary sunk cost level groups.

H_{04}: There will be no difference in mean time investments between different time sunk cost level groups.

H_{A4}: There will be a difference between the mean extents of time investments for the different time sunk cost level groups.

Last but not least, the nature of impact of sunk costs on the willingness to invest is investigated (e.g. whether investments are systematically related to sunk costs and if so if this relation is increasing or decreasing):

H_{05}: There will be no correlation between the monetary height of sunk costs and the proportion of investments.

H_{A5}: There will be a correlation (either positive or negative) between the monetary height of sunk costs and the proportion of investments.

H_{06}: There will be no correlation between the time extent of sunk costs and the extent of investments.

H_{A6}: There will be a correlation (either positive or negative) between the time extent of sunk costs and the extent of investments.

7.1.2 Sample

Three hundred eighty-eight respondents were reached via e-mail using snowballing technique, who posted a valid response to one of the on-line scenarios (this number is already adjusted after exclusion of repeated answers, which were assessed according to matched parameters such as time of connection together with age, domicile and occupation selections). Participants were randomly assigned to one of the eight groups.

Number of participants in each group stemmed from 47 to 50. Overall, about 64% (247) of participants were female, stemming from 27-36 in one group. Also 67% (260) of participants lived in a city, the rest of the participants were more or less equally distributed in village, small towns and towns. Similar distribution was kept within groups as well (see Table 10 below).

Table 10: Frequencies for different domiciles within research groups

		Domicile				Total
		Village	Small town	Town	City	
Scenario	Zero money costs	6 (12.8%)	6 (12.8%)	1 (2.1%)	34 (72.3%)	47 (100.0%)
	Zero time costs	5 (10.2%)	7 (14.3%)	8 (16.3%)	29 (59.2%)	49 (100.0%)
	Small money costs	3 (6.3%)	7 (14.6%)	7 (14.6%)	31 (64.6%)	48 (100.0%)
	Small time costs	4 (8.0%)	3 (6.0%)	9 (18.0%)	34 (68.0%)	50 (100.0%)
	Medium money costs	8 (16.7%)	9 (18.8%)	3 (6.3%)	28 (58.3%)	48 (100.0%)
	Medium time costs	3 (6.4%)	4 (8.5%)	5 (10.6%)	35 (74.5%)	47 (100.0%)
	Large money costs	5 (10.2%)	3 (6.1%)	0 (0.0%)	41 (83.7%)	49 (100.0%)
	Large time costs	4 (8.0%)	12 (24.0%)	6 (12.0%)	28 (56.0%)	50 (100.0%)
Total		38 (9.8%)	51 (13.1%)	39 (10.1%)	260 (67.0%)	388 (100.0%)

Ages in the whole sample stemmed from 15 to 59, with rounded mean at 28. Similarly, group mean ages stemmed from 27 to 31 (see Table 11 below). As can be seen from Figure 4 below, the distribution of the sample population is somewhat cumulated around young adults (20-30 years old), in general

resembles the standard distribution but is skewed to the right (with skewness of 1.862) and peaks far above a normal distribution.

Table 11: Mean ages within groups

Scenario	Mean	Std. Deviation	N
Zero money costs	30,57	9,224	47
Zero time costs	26,98	4,525	49
Small money costs	27,98	8,276	48
Small time costs	27,72	8,413	50
Medium money costs	26,81	6,269	48
Medium time costs	28,96	7,740	47
Large money costs	28,39	7,337	49
Large time costs	30,00	10,073	50
Total	28,42	7,934	388

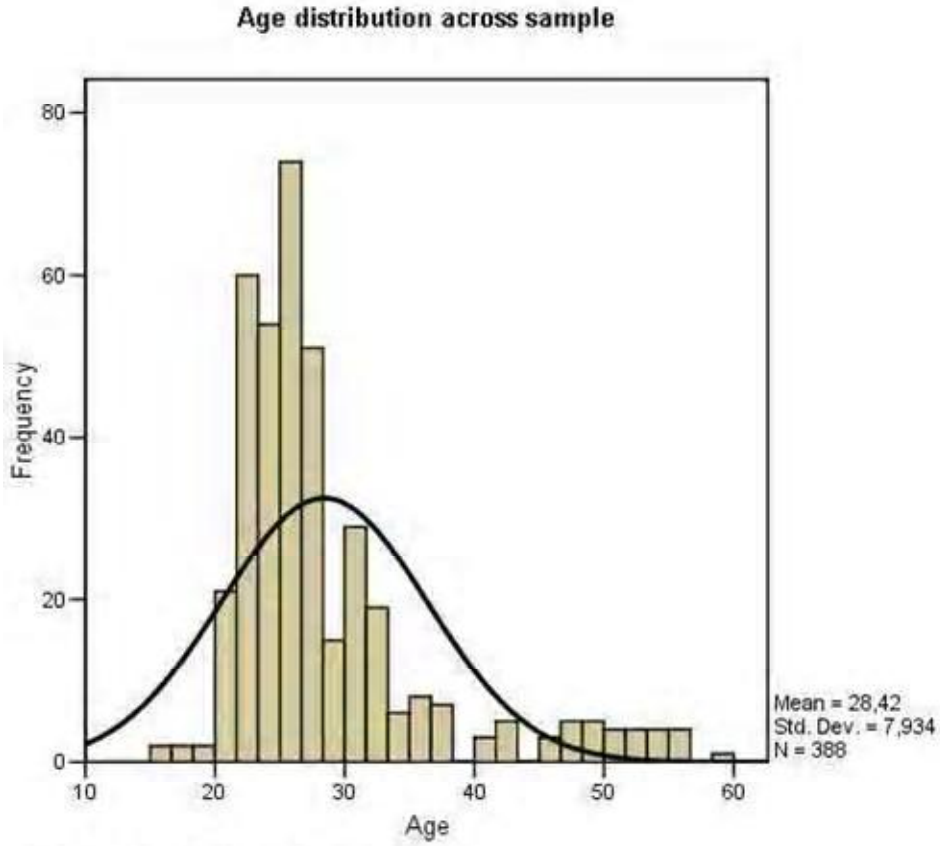


Figure 4: Age distribution across sample

7.1.3 Materials

Results of Phase B of the Pilot study provided an interesting basis for further development of the method employed in Main study. Pilot study showed that there are limitations to the scenario applied, in Phase B the results suggested undesirability of continuation in investing when sunk costs were incurred. Namely, if one language course was already taken, subjects tended to prefer to exit and not take the second course, resulting in supposed de-escalation of commitment for the second job option.

Nevertheless, both phases of the Pilot study suggested that taking a language course as such is desirable for the sample used, not repeatedly though when the second job option was not superior to the first. Therefore, the experimenter decided to change this crucial part of the scenario and suggest a language exam rather than a second language course as the potential investment. The author believed that an exam might be desirable also in case of incurring sunk costs in language education while keeping the job offers in the scenario comparably desirable. Hence, the decisional question participants were asked in Main study, relative to money or time sunk costs, was: *„Based on this information decide whether you would take the exam and how much money/time you would be willing to pay for it/spend on preparation"*

Derived from the variants of sunk costs were possible answer options – three answer choices corresponded with sunk cost terms, one answer choice represented a proportion of the lowest sunk costs, and one answer choice represented exiting (no investment). Answer choices are presented in Table 12:

Table 12: Answer choices

	Exit	Small investment	Medium Investment	Large investment	Extensive investment
Time	0 hours	2 days (12 hours)	1 week (36 hours)	2 weeks (72 hours)	3 weeks (108 hours)
Money	CZK 0	CZK 3,000	CZK 6,000	CZK 9,000	CZK 12,000

Qualitative data from Pilot study also proved that financial situation was indeed one of crucial factors that influenced participants' decision-making. In the pilot study financial situation of the decision-maker was specified as sufficient, there was no clear need to change this information as such, due to its importance to subjects, author decided to further specify financial resources available to the decision-maker. Hence, funds were described as 57 000 CZK for living expenses for 3 months (derived from the average wage in Czech Republic at the time of research preparation, which was approximately 19 000 CZK, rounded to thousands, according to the Czech Statistical Office, www.czso.cz). In addition, the author argues, specifying available resources adds to the context richness of the scenario, which, as Staw (1997) pointed out, is crucial for such experimental design attempting to simulate sunk cost or escalation effects.

Moreover, an extra budget for educational purposes, put aside by the decision-maker himself, was specified. The mental budget, which, according to Heath (1995) and Johnstone (2000), might work as a potentially de-escalating factor, was set at 10 000 CZK or 6 hours a day on average (depending on whether monetary or time scenario was concerned). It would have been desirable to vary the budget as well as the sunk costs incurred on language education, however, it would result in multiplied number of experimental groups. Therefore, it was kept constant, as the experimenter did not have sufficient

information to estimate whether a large enough sample would be gathered to cover for more than 8 research groups.

In all other respects the scenario was kept as used in Phase B of Pilot study. All versions of the scenario as displayed on-line are to be found in Appendix 2.

7.1.4 Procedure

Main study was conducted on-line. In order to reach participants an e-mail was sent and, in a snowballing manner, forwarded by some percentage of recipients further. Recipients of the original or forwarded e-mail were informed that a study was conducted on-line as a part of experimenter's thesis focusing on individual decision-making. Recipients were then kindly asked to fill in the short questionnaire on-line at http://choice.unas.cz/. By clicking on this link, they were redirected to introductory page (see Appendix 3), from which they moved to the scenario (see Appendix 2). A short description of the purpose of the experiment was provided on introductory page. Each participant was assigned to one of the eight groups on a random basis, thereby seeing only one of the eight scenarios. Respondents were asked to carefully read the scenario and put oneself in the situation presented. Free space was provided for notes and questions. Validity of answers was checked automatically, all fields had to be filled in, in order to successfully hand in the questionnaire. When posted, final *"Thank you"* page was displayed (see Appendix 3).

7.2 Results

7.2.1 Monetary based scenarios

Frequency and percentage measures as depicted in Table 13 below show, that the rate of exiting and the rates of continued monetary investment are similar across different sunk cost groups. This is reflected also by the results of the Chi-Square Tests performed. As it turns out, differences in willingness to continue/exit (frequency of exit) are not significant (see Table 21 in Appendix 4).

Table 13: Frequencies of continue/exit decisions in research groups

		Scenario				Total
		Zero money costs	Small money costs	Medium money costs	Large money costs	
Answer	Exit	4 (8,5%)	2 (4,2%)	3 (6,3%)	4 (8,2%)	13 (6,8%)
	Small investment	17 (36,2%)	17 (35,4%)	15 (31,3%)	16 (32,7%)	65 (33,9%)
	Medium Investment	14 (29,8%)	20 (41,7%)	19 (39,6%)	16 (32,7%)	69 (35,9%)
	Large investment	8 (17,0%)	3 (6,3%)	6 (12,5%)	5 (10,2%)	22 (11,5%)
	Extensive investment	4 (8,5%)	6 (12,5%)	5 (10,4%)	8 (16,3%)	23 (12,0%)
Total		47 (100,0%)	48 (100,0%)	48 (100,0%)	49 (100,0%)	192 (100,0%)

While the willingness to exit or continue investing money into language exams does not seem to be influenced by the extent of sunk costs incurred (H_{A1} is refuted), descriptive data for the mean differences in the extent of investments are considered next (see Table 14 below). Mean investments and investment characteristics appear very similar as well, suggesting inter-group differences will not be statistically significant (see Figure 5 on the next page).

Table 14: Mean investments within research groups with monetary investments

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Zero money costs	47	7595,74	2924,109	426,525	6737,19	8454,30
Small money costs	48	7750,00	2613,386	377,210	6991,15	8508,85
Medium money costs	48	7562,50	2766,873	399,364	6759,08	8365,92
Large money costs	49	7775,51	3117,593	445,370	6880,03	8670,99
Total	192	7671,88	2841,657	205,079	7267,36	8076,39

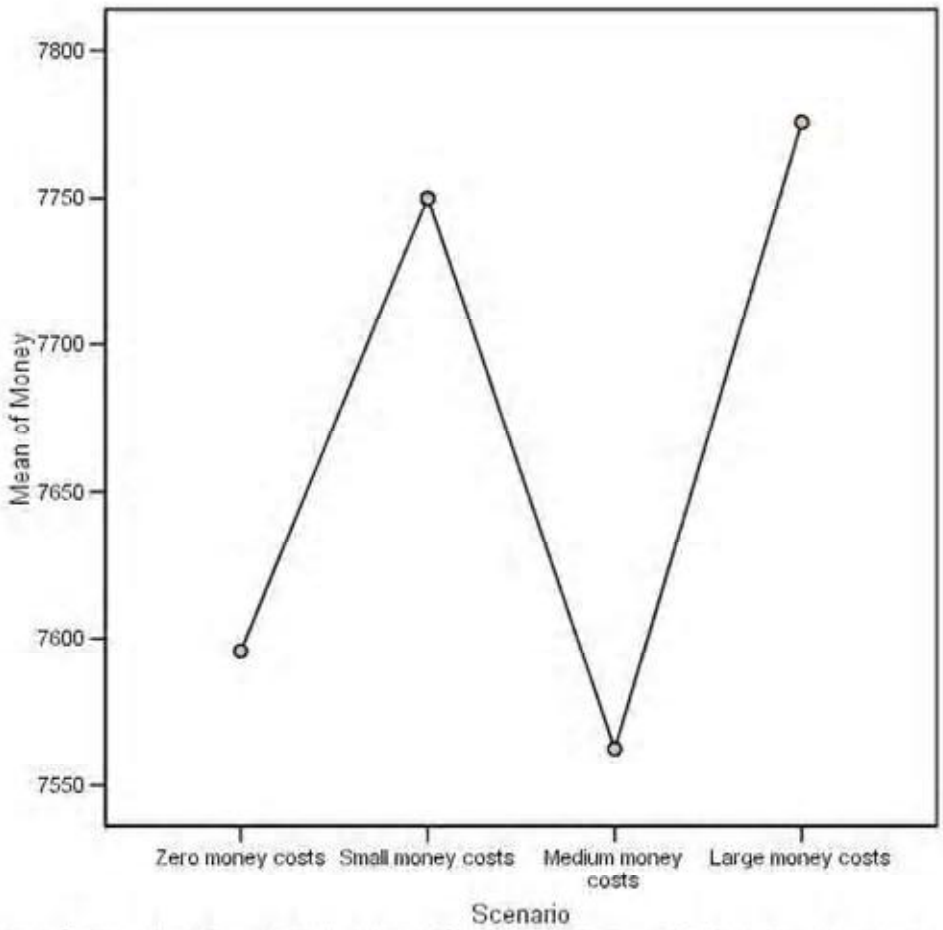


Figure 5: Mean investments in each level of sunk costs for monetary investment scenario

While, according to Levene's test, equal variances in all groups can be assumed (see Table 22 in Appendix 4), One-way ANOVA (Analysis of Variance) was employed to examine the significance of between-group differences in mean investments. As it turns out, in line with the descriptive data, differences in mean investments are not statistically significant (see Table 23 in Appendix 4), e.g. mean extent of monetary investments in this experiment is not in any way dependent on the level of sunk costs (H_{A3} was refuted).

While no relation was found between the level of sunk costs and the mean investment, to make sure there is no relation between the investing pattern and sunk cost level's, correlations were conducted, both Pearson's and

Spearman's to eliminate both linear and non-linear relations. Only negligible correlations without statistical significance were found, hence refuting H_{A5} (see Tables 24 and 25 in Appendix 4).

7.2.2 Time based scenarios

As the frequencies and percentage of choices in each group depicted in the following table (Table 15) show, there is a slight tendency to exit more often the larger the sunk costs as well as to invest somewhat less with increasing sunk costs in time-based scenarios.

Table 15: Frequencies of continue/exit decisions within research groups

		Scenario				Total
		Zero time costs	Small time costs	Medium time costs	Large time costs	
Answer	Exit	1 (2,0%)	2 (4,0%)	2 (4,3%)	3 (6,0%)	8 (4,1%)
	Small investment	2 (4,1%)	10 (20,0%)	2 (4,3%)	5 (10,0%)	19 (9,7%)
	Medium Investment	11 (22,4%)	11 (22,0%)	16 (34,0%)	17 (34,0%)	55 (28,1%)
	Large investment	18 (36,7%)	10 (20,0%)	10 (21,3%)	14 (28,0%)	52 (26,5%)
	Extensive investment	17 (34,7%)	17 (34,0%)	17 (36,2%)	11 (22,0%)	62 (31,6%)
Total		49 (100,0%)	50 (100,0%)	47 (100,0%)	50 (100,0%)	196 (100,0%)

Both of these effects were statistically evaluated: Chi-Square Tests were used to evaluate differences in willingness to invest in groups with different extents of time sunk costs; and One-way ANOVA was used to examine mean differences in time investments between groups. Results of Chi-Square tests (see Table 26 in Appendix 4) did not show a significant difference in willingness to continue or exit between groups with different levels of time spent (H_{A2} was refuted, null hypothesis was supported).

The descriptive data, shown in Table 16 below, aggregating mean time investments, showed slight differences and an overall tendency to decline in mean investment the higher the initial investment - sunk costs (see also Figure 6

below). Levene's test for homogeneity of variance of research groups was significant (p<0,01), suggesting that ANOVA is not the appropriate statistical method to be employed, therefore, separate T-tests comparing means were performed for each pair of research groups so that unequal variances could be assumed as appropriate (see Table 27 in Appendix 4). Only one of the comparison turned out to be significant (p<0,05): mean difference between zero and large sunk costs groups, suggesting a decreased mean investment and increased exiting in case of large as opposed to zero sunk costs group.

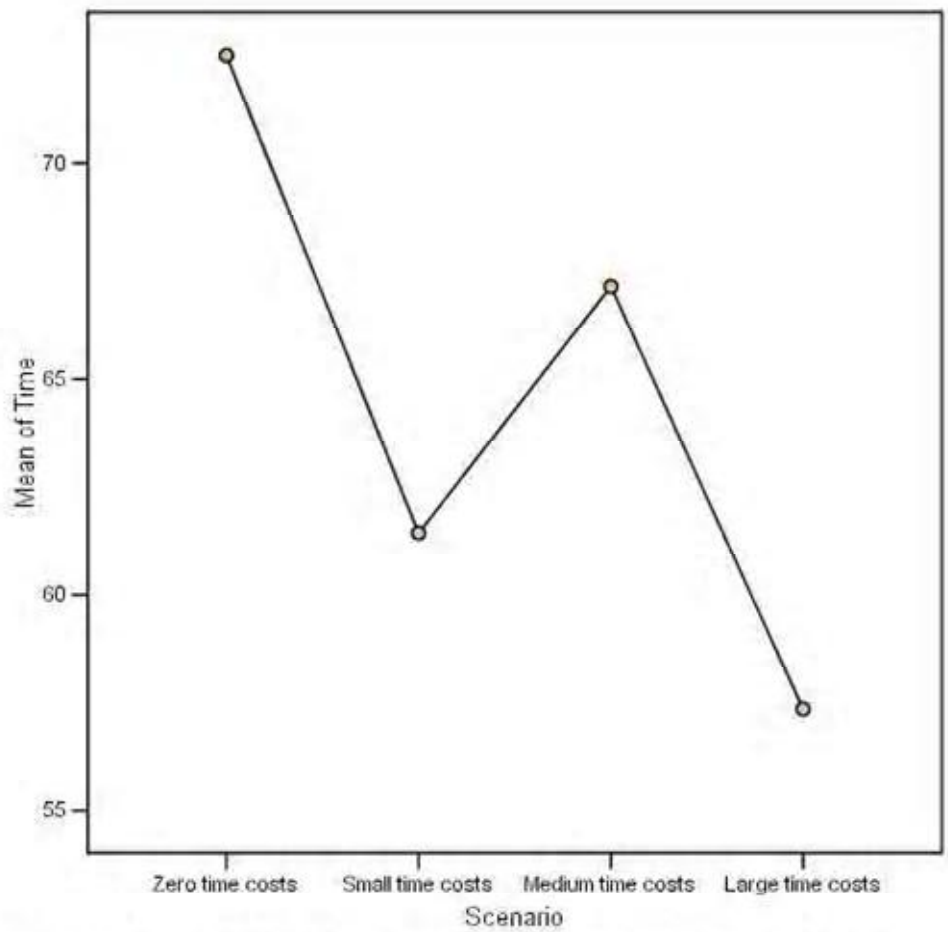


Figure 6: Mean investments in each level of sunk costs for time investment scenario

Table 16: Mean investments within research groups with time investments

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Zero time costs	49	72,49	31,840	4,549	63,34	81,64
Small time costs	50	61,44	39,662	5,609	50,17	72,71
Medium time costs	47	67,15	35,883	5,234	56,61	77,68
Large time costs	50	57,36	34,736	4,912	47,49	67,23
Total	196	64,53	35,846	2,560	59,48	69,58

Despite the fact that ANOVA was not performed, one of the separate group comparisons reached significant values, hence, although not confirming H_{A4}, suggesting a relation exists between large enough sunk costs and exit/continue decisions (see Table 30 in Appendix 4). Correlation tests were conducted to see whether a overall declining tendency will be acknowledged as a relation between time investments and sunk costs. Both Pearson and Spearman correlations show small negative relations (-0,125 and -0,124 respectively), e.g. the higher sunk costs the smaller the time investment, and reach significant values if tested for 1-tailed significance hypothesis with $p<0,05$, supporting hypothesis H_{A6}, that is, for a relation in this specific direction (see Tables 28 and 29 in Appendix 4).

To summarize, data for time investments did indeed show weak relation between sunk costs and time investments, suggesting that the higher the sunk costs the higher the tendency to exit or invest less. However, the mean differences and the willingness to invest have only reached significant levels for comparison between zero and large sunk cost groups, and correlation, although significant ($p<0,05$), reached only low values, suggesting other factors were in play besides sunk costs.

7.3 Discussion

Findings of the Main study have crucial importance for both developments and applicability of the newly developed decisional scenario and for future research suggesting there are fundamental factors not yet fully understood, which are important for inciting and understanding the processes involved in sunk cost and reverse sunk costs effect, eventually for (de-)escalation of commitment.

While in scenarios using monetary sunk costs and investments no significant relation was found between sunk costs and exit/continue decision or the extent of overinvestment, data for time investments did indeed show a certain relation exists between sunk costs and exits or overinvestment. This relation however was that of an incoherent reverse sunk cost effect, suggesting a weak negative correlation between investment and sunk costs. Various factors are expected to be the source of these findings, those specific to the Main study are discussed below (limitations common to Pilot and Main study research are discussed in Section 8 – General Discussion):

1) Nature of the scenario

Probably the most crucial point that was revealed by this research is that the factors implicit to the nature of decisional scenarios used in this and similar studies are not fully understood. Besides the level of sunk costs and the mental budget, the subjective and objective probability of success all accounted for, consciously neglected factors such as emotional and personality alignment etc., and other factors may well have player an important part in this research. The author believes it has been the lack-of-loss nature of the scenario that resulted in a failure to elicit sunk cost effect and escalation of commitment in research subjects. Subjects, the author argues, were bound to de-escalate their

commitment through reverse sunk cost effect as their mental budget was specified (although, even this effect was only weakly present in the time investment scenarios).

In other words, the scenario, author supposes, did not elicit strong enough commitment through inducing the feeling of extensive loss if failure was to occur, be it monetary or emotional losses. This, according to the author, is the core limitation of research method used in this study and is also the source of confounding in monetary as opposed to time investments. The author suggests, time investments imply more commitment in subjects than mere financial investments, which do not imply neither effort nor energy had to be incurred, which, according to the author, is the key reason for acquired results.

Secondly, important aspects that could possibly influence the results involve the sample and the method of administration.

2) Limitations of sample

As was mentioned in Section 7.1.2, the population, although embracing a large range of ages, was rather young (mostly 20-30 year olds), which is due to sampling method as well as to the method of administration, i.e. snowballing was used addressing mostly young adults in the first place, moreover, web-based administration limited the reachable population to internet users, in areas such as the Czech or Slovak Republics again mostly young adults.

In addition, Main study sample consisted mostly of females, which is again given by the method of sampling (snowballing was released in the psychology student environment, which is largely dominated by female students).

Finally, the author supposes the domicile distribution also reflects the population from which the sample is derived, that is internet users. However, the

population interval for each domicile was not given in the questionnaire; thus, this measure relied on subjective perceptions, which may have well been skewed.

Nevertheless, since reverse sunk cost effect has been elicited in Phase B of the Pilot study with much smaller samples, the author argues these limitations of the sample are not the core reason for results of the Main study, though may of course have influenced it.

3) Limitations of online administration

Lastly, it is crucial to account for the fact that this experiment was web-delivered, which elicits concerns regarding the user-friendliness and comprehensiveness. However, web-based experiments were shown to be suitable for scenario and questionnaire research (McGraw, Tew and Williams, 2000). Nevertheless, the external environment was different for each participant and could have interfered with his or her performance. It was suggested that this deficit could be compensated for by large samples (McGraw, Tew and Williams, 2000). The sample in this study was sufficient as for statistical analysis and, the author does not see any reason to believe it shall not suffice for the purposes of this study as far as internet administration is concerned.

8 General discussion

Main goal of this study was to develop a new decisional scenario, which would allow studying the (reverse) sunk cost effect and eventually (de-) escalation of commitment in a common and personal context in order to reveal and potentially manipulate processes and factors influencing these intuitive judgment processes (heuristics and biases).

In Pilot study this new scenario was developed and adjusted according to quantitative and qualitative data, resulting in successful elicitation of a reversed sunk cost effect in Phase B of the Pilot study. Further adjustments were made to the method used in Main study to allow observation of either reversed or regular sunk cost effects in the context of greater contextual richness and including the factor of a mental budget, which is supposed to invoke reversed sunk cost effects.

Author suggests the results described and discussed in appropriate sections are due to aspects belonging to two common areas in addition to specific factors examined in relevant sections:

1) Limitations of the design as such

The design of the study was based on a hypothetical decisional scenario, and despite the fact that respondents were asked to put themselves in the shoes of the person described in the scenario, such a design is bound to be limited by its hypothetical nature. Obviously, this design can never overpower a real or even practically simulated decisional situation in its validity.

Moreover, besides this general methodological issue, there are concrete limitations of the method as employed in this particular study, which may have influenced acquired results.

2) Limitations of the method employed

Firstly, as has been mentioned previously, a new stimulus scenario was developed for the purposes of this study. Besides the limits of a hypothetical scenario design, each scenario is also limited by the nature of decisional situation and richness of the context described in the scenario. As Staw puts it: *„I worry that the use of abbreviated scenarios will produce weakened rather than exaggerated escalation effects. Without some contextual richness to ground the phenomena, it may be difficult to simulate the behavioral forces operating in real escalation situations"* (Staw, 1997, p.211).

It is difficult to evaluate the richness or poorness of the context involved in this particular scenario; however, it has been developed in more detail for the Main study according to the needs of the research along with the qualitative considerations received from subjects in Pilot study. As it appears, elimination of strong emotional phrasing, which was, to some extent, present in Phase A of the Pilot study enhanced the reverse sunk cost effect in Phase B. On the other hand, changes in incentives in the scenario for Main study again weakened this effect leading to insignificant results in monetary scenarios and only weak negative correlations in time scenarios of the Main study.

The author argues that elimination of emotional phrasing from the scenario was both desirable and limiting to the research. Eliminating emotionally charged statements was useful in eliminating confounding the research with emotional aspects of decision-making. However, it was also bound to result in decreased initial levels of incited commitment, thus, resulting in decreased potential to evoke regular sunk cost effect.

Moreover, lack of emotionally phrased, feeling of potential loss (exceeding the sunk costs) and/or fear of post-decisional regret inducing phrases

in the scenario, was probably the reason why relatively swift commitment changes were observed in Phase B of the Pilot study and in time scenarios in Main study. In fact, the author hypothesizes, this was the reason for weak commitment resulting in observations of reversed sunk cost effects regardless of the extent of sunk costs. The author uses the term *"weak commitment"* in the sense of a weak bond to the initial choice described in the scenario if circumstances are unfavorable (sunk costs are presented), because, as has been shown before, the tendency to complete was strong in all conditions (continuing prevailed over exit in most cases).

Moreover, methodologically the measure of exits was operationalized as zero investment. Hence, subjects were not allowed a switch option e.g. to choose a different option. In fact, research subjects were only allowed not to invest anything or to invest something in the option presented. As the author believes, this was a rather limited setting and respondents were therefore forced a constrained set of choices. Supposedly, this may have strongly influenced the results towards tendency for completion (continuing rather then exiting).

Both emotional phrasing and/or feeling of loss (anticipated regret), and broader set of options seem to be strong factors possibly affecting decision incited by the scenario in this study. While only hypothetical suggestion about their strength and direction of their impact were made so far, the author suggests, this would be a fruitful direction for future research examining factors influencing intuitive judgments in personal exit/continue decision-making.

This research showed that this scenario has potential for eliciting (reverse) sunk cost effect and (de-)escalation of commitment. Author believes this potential shall be capitalized on in the future, as this kind of personal decisional scenario was barely used in studying these phenomena. Results

suggested that cognitive heuristics and biases leading to these effects were influenced by many factors, among others by emotional statements inducing fear of loss and anticipated regret as well as stronger preferences for either option, thus inducing extensive commitment. Exploring such factors, that is levers stirring personal intuitive judgments will make the theoretical conception more valid for studying everyday decision-making.

Moreover, this research specifically focused on complex temporal decisions referred to as *"exits"*, which, according to author's awareness and knowledge, were not before exhaustively conceptualized. As was showed in this thesis, these decisions seem to indeed form a characteristic sub-set of decisions under uncertainty, generic enough to encompass personal as well as business decisions, while specific enough to elicit distinctive heuristics and biases effects. The author hopes, further research in this area will help specify the concept of exits so far merely outlined in psychology and behavioral economics.

9 Improving exit decision-making

It was suggested before, that exits as a subset of temporal decisions are prone to intuitive judgments errors. As the research accompanying this thesis showed, many factors play a role in eliciting (de-) escalation of commitment and (reverse) sunk cost effects, indicating there is space for improvement and elimination of errors in exit decision making. This chapter is dedicated to a short overview of possible methods and techniques enhancing exit decision-making. However, the author argues, these are mostly relevant in business context and are somewhat too mismatched for everyday personal decision-making as the comic strip below well illustrates (source: www.comics.com/creators/workingitout, by Charlos Gary, published on February 7th 2006):

"I can't decide between the large and the extra grande. Do you mind if I form a focus group?"

Nevertheless, intuitive aspects of exit decision-making can be improved, heuristics and biases involved are believed to be at least partially eliminated through systematic and structured reasoning, therefore the author believes is crucial to mention existing suggestions and, more importantly, focus on research of exits in personal context to identify which and how to adjust and improve core decision-making corruptors in this area.

9.1 Techniques improving intuitive deficiencies in exiting

One of the biased tendencies influencing exit decision-making is overoptimism. Excessive optimism is involved in the planning process resulting in exaggeratedly optimistic prospect of overinvestment in a failing venture. Lovallo and Kahneman (2003) describe a simple approach to forecasting that would help provide more realistic estimates of future development to the decision-maker, rendering more accurate data and probabilities relevant for exiting. This approach is referred to as *outside view* or *reference-class forecasting* and relies on using an analogous reference class of events or situation according to which the current decision problem is evaluated (Lovallo and Kahneman, 2003). Authors suggest the following five steps as the core of this forecasting technique:

1) Select a reference class
2) Assess the distribution of outcomes
3) Make an *intuitive* prediction of current project's position in this distribution
4) Assess the reliability of this prediction
5) Correct the *intuitive* estimate

As can be seen, this approach makes use of intuitive judgments but improves it in two ways in order to reduce biases: firstly, the choice of reference group is to be made more consciously than merely on the basis of accessibility; secondly, the overoptimistic approximation made in step 3 is further challenged and adjusted through steps 4 and 5. Thus, such simple change of approach to planning can help eliminate key information corrupting biases such as overoptimism, also involved in exit decision-making, both before the venture is taken on and when it is to be exited and changed situation is anticipated.

9.2 Computerized decision-making methods and exits

In last decades an extensive growth of methods improving and supporting decisions in organizational context was observed, mostly aided by the growing capacities of modeling, efficient enough to model decision even under complex conditions of uncertainty and risk (Gros, 2003). These advancements allow what Simon (1969) called for, that is complex computational techniques looking for optimal decisions, of which the human cognitive system is not capable. According to Gross (2003), research in this area has three common features: 1) find scientific ways of supporting decision-making; 2) application of modeling technology in teamwork; and 3) respecting the dynamics of real decisional processes.

One of the techniques used to boost decision-making is simulation of possible decisional scenarios (Jones, 1972; Simon, 1969). Simulation is a broad term, for the purposes of exit decision-making it is understood as modeling and representing a decisional situation, usually business situations (Jones, 1972). Simulating a possible exit strategy versus continuing in a venture requires a precise enough model of the real situation including the dynamic factors involved in the process of taking and exercising the exit decision vs. continuation for a reasonable period of time (Jones, 1972). While decisional situations, exits including, are usually too complex to be simulated without excessive simplification by human mind, computerized computation provides good support for such simulations (Simon, 1969).

Nevertheless, however successful for example in the area of planning and production, distribution networks and HR management, these methods are still strongly dependent on the ability to properly and precisely identify and define the problem and the relevant goals, that would allow for specification of an

appropriate model of the real problem situation (Gros, 2003; Simon, 1969). Moreover, despite the effectiveness of modeling, the results of such models still require qualitative assessment (Gros, 2003; Simon, 1969). Still, despite the main limitations applicable for all decision-support techniques:

„1. A simulation is no better than the assumptions built into it

2. A computer can do only what it is programmed to do." (Simon, 1969, p.15). Simon (1969) argues, it can provide new information and therefore also new insights. Regardless of the validity of assumptions, human cognitive limitations often do not allow us to derive correct consequences of a complex set of assumptions, however, according to Simon (1969), simulation allows for such derivation, even in areas such as weather prediction. Still, the dichotomy of *"heads vs. formulas"*, e.g. human decision maker vs. computerized decision-making continues to influence the domain of computer based Decision support systems (Skořepa, 2005). The belief that in rare and specific situations a standard decisional process could lead to less than optimal solutions, gave rise to interactive Decision support systems, which do not attempt to overtake decision-making, but merely allow for a better structure of information processing of the decision maker (Skořepa, 2005).

A simple technique commonly employed in decisional simulation, and often effectively is decisional tree, e.g. a graphical scheme with branches representing different options and their expected probabilities (Jones, 1972; Wisniewski, 1996). Decisional trees also allow for graphical depiction of complex decisional situations under uncertainty, working with probabilities and sequential decisional actions (Wisniewski, 1996). Decisional trees as graphical representation allow for easier information processing of values for different options (Wisniewski, 1996). Moreover, Wisniewski (1996) argues, a set of

decisional trees can be used to depict different future scenarios, depending on various values of important future conditions, thus facilitating decision-making now and in future.

This predictive potential can well be employed in order to eliminate sunk cost effects by planning and anticipating exit points and terminal costs in advance. This tool is referred to as *contingent road maps* and presets what Horn, Lovallo and Viguerie (2006) call signposts, or important decision bundles, points at which sequential decisions are to be taken as well as conditions under which to proceed and under which to exit, thus stabilizing the decisional criteria applied by responsible executives.

Horn, Lovallo and Viguerie (2006, p. 72) warn, that these signposts are to be specified before a project is taken on, or at least early enough, so that the signpost analysis avoids situational bias traps. Even if due to new information signposts need adjustment, these should merely be done to future not present signposts (ibid.) As Horn, Lovallo and Viguerie put it: *„If a signpost suggests, for example, that a project or business should be shut down but executives decide that the company has invested too much time and money to stop, the sunk-cost fallacy and escalation-of-commitment bias are quite likely at work"* (Horn, Lovallo and Viguerie, 2006, p.73). This practice can adjust intuitive heuristics and biases involved in planning as well as present at concrete exit points, by specifying exit conditions and mileposts for reconsidering exiting. However, Jones (1972) also notes, that more complex situations could require too complicated decisional trees and in these cases he recommends a simplification of the decisional tree on a sample of branches, which would be sufficient for the decisional analysis. Nevertheless, even simplified, this method can be of great help for personal as well as business exit decision-making.

9.3 Knowledge management and exits

Knowledge Management is not yet clearly defined, according to a survey by Hannig and Zwerger (in Hannig, 2002, p.64) entrepreneurs most commonly understand it as a wide range of activities and factors involved in effective retrieval and transfer of information and knowledge within the company. According to the survey (Hannig and Zwerger in Hannig, 2002, p.64) these include organizational, information technology as well as psychological factors. In other words, it seems that Knowledge Management is a comprehensive term referring to a complex set of tools and activities involved in providing access and appropriately transferring knowledge where it is in the organization.

One of the main tools used for managing operations in organizations are Management Information Systems (MIS). Ever since the 1960s, MISs became a core tool and a basis of knowledge management in organizations (Hannig in Hannig 2002). Not only do these systems provide data for decision-making of management, but they also attempt to support the decisional process as such (Hannig in Hannig 2002). In first decades of MIS development, they were limited by hardware and software capacities, as well as by customers' skepticism to entrust valuable data and decisions to computers. MIS only broke through in the market in the 1990s (Hannig in Hannig 2002). Nowadays, MIS systems are common tools companies use to gather and process data about their companies stemming from details of each sale to overall profitability of the company for example. Obviously, using data from these information processing systems to enhance especially relevant anchors for exit decision-making, thus avoiding anchoring fallacy, is most desirable and is a common practice in many, especially larger companies, which tend to have a more complex and more bylaw-set MIS.

10 Summary

This thesis began with investigation of the concept of individual decision making under uncertainty, namely the application of findings and theoretical implications stemming from *Prospect theory* and *Intuitive judgment approach* as well as related research on exit decision-making. Decision-making was defined as the process of choice as opposed to the process of looking for alternatives referred to as problem-solving. Historical perspective suggested that overly optimal models of decision-making failed to predict empirical findings, therefore the classical *Expected utility approach* was adapted by Kahneman and Tversky in their *Prospect theory*. In reaction to empirical findings controvert optimal expectations of *Expected utility theory*, Kahneman and Tversky adjusted the model to incorporate the observed inconsistencies of preferences and risk-seeking/aversion in choice behavior.

Further improvements in understanding the cognitive processes involved in decision-making were made, resulting in incorporating judgments along with reasoning and choice into the consideration of psychology. Hence, stemming from the concept of bounded rationality and empirical findings showing systematic errors in expert judgments, the *Intuitive judgment approach* was derived. On grounds of research results various heuristics (such as representativeness, anchoring and availability) as well as systematic biases (sunk cost fallacy, overoptimism, escalation of commitment effect etc.) were specified and studied by researchers in various contexts.

These theoretical considerations along with exit decision-making definition suggested that exit decisions, although so far seldom examined separately, occur in specific temporal situations and induce, among other, also

specific effects in individual decision-maker. Case studies were presented to support the assumption that exits do in fact occur at all the wrong times. Heuristics and biases involved in exit decision-making were anchoring and confirmation bias, and specifically characteristic for exits along with risk-aversive/seeking tendencies were *(reverse) sunk cost* and *(de-)escalation of commitment effects*, which were also studied empirically in this thesis.

Research consisted of two main parts: Pilot and Main study. While Pilot focused on research method development (exploring effects of a scenario attempting to elicit reverse or regular sunk cost effect), Main study aimed at examining (reverse) sunk cost and respective (de-)escalation of commitment effects in monetary- and time-domain personal decisions.

Results were equivocal. Phase B of Pilot study displayed a reversed sunk cost effect and, hence, de-escalation of commitment as a result of elimination of confounding offer attractiveness observed in Phase A of Pilot study. This result suggested that the newly developed scenario has potential for inducing reverse sunk cost effect, supporting the expectation that such effects are present in individual and personal exit decision-making. The author argues, that constellation of this new scenario can be found that would elicit regular sunk cost effect. Therefore, the author argues, new scenario is relevant for inducing studied effects and has also potential in flexibility, enabling to test for time besides monetary investments and possibly also other types of investments.

Main research, on the other hand, resulted in less favorable results. Main research focused on exploring the (reversed) sunk cost effect with four instead of two levels of sunk costs and tested time as well as monetary sunk costs. While in scenarios using monetary sunk costs and investments no significant relation was found between sunk costs and exit/continue decisions, data for time investments

did indeed show a decreasing relation. This relation however was that of an incoherent reverse sunk cost effect, e.g. there was overall declining tendency in investing (increased exiting takes place and lower investments are granted), but not consistently across increasing levels of sunk costs incurred in each group.

These results may have various reasons as suggested in discussion sections such as the nature of the decision chosen for the scenario, sample shifts and low commitment levels to begin with. Moreover, this hypothetical scenario design has limited applicability and most importantly validity for real-life decisions, more so when decision-makers were granted limited set of choices (exit or invest options were present, no strategy switching options were introduced). Nevertheless, research results also show huge potential of the newly developed method. Despite equivocal findings, the author believes this thesis provided basis for further research and suggested factors neglected by theoretical models and hitherto empirical findings, to play a role in personal exit decision-making, such as emotional framing or the nature of sunk costs.

Moreover, despite vague empirical results, this thesis managed to 1) clearly conceptualize personal exits as specific subset of temporal decisions under uncertainty, 2) to set up a new research scenario focused on individual and personal exits, and 3) also mention methods and techniques applicable for improving exit decisions.

11 Appendixes

11.1 Appendix 1

11.1.1 Phase A

Control Group – Zero sunk costs incurred

Následující dotazník je určen ke zkoumání procesu rozhodování jednotlivce. Ráda bych Vás požádala o spontánní a upřímné vyplnění tohoto krátkého dotazníku. V případě, že máte k dotazníku jakékoliv dotazy či připomínky, můžete je zaznamenat v části určené pro poznámky. Po vyplnění dotazníku bude následovat diskuze o tom na jakém základě a jakým způsobem jste se v této situaci rozhodovali.

Dotazník je anonymní. Pro statistické zpracování prosím vyplňte tyto údaje:

Dnešní dat ___ . ___ . 2007
Pohlaví Muž Žena
Věk _____
Dosažené Základní
Středoškolské
Vysokoškolské
Zaměstnár Student
Jiné: _____

Představte si následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Navíc si uvědomujete, že na dnešním trhu práce je důležitá znalost cizích jazyků, a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily.

Měl/a jste celkem štěstí a z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Tato pozice se Vám zatím líbí víc, slibuje větší plat, ale také zajímavější náplň práce. Nicméně, aby jste mohl/a ve výběrovém řízení uspět musel/a by jste absolvovat jazykový kurz. Pokud by Vás přijali, firma by Vám jej plně uhradila. Kurz se musí platit předem v plné ceně a kursovné se nevrací pokud kurz neabsolvujete.

Na základě těchto informací se rozdohněte zda by jste si zaplatil/a jazykový kurz.

Ano Ne

Pokud jste odpověděl/a ano, kolik by jste byl/a ochoten/ochotna za jazykový kurz maximálně zaplatit?

Které informace byli při Vašem rozhodování nejdůležitější?

Jaké další informace nebo změny v scénáři by musely nastat abyste se rozdl/a jinak?

Poznámky:

Děkuji za vyplnění dotazníku.
Nina Bakošová, studentka 5.ročníku na FF UK v Praze
S Vašimi dotazy mě můžete kontaktovat na nina.bakosova@gmail.com

Experimental group – Medium sunk costs incurred (9 000 CZK)

Následující dotazník je určen ke zkoumání procesu rozhodování jednotlivce. Ráda bych Vás požádala o spontánní a upřímné vyplnění tohoto krátkého dotazníku. V případě, že máte k dotazníku jakékoliv dotazy či připomínky, můžete je zaznamenat v části určené pro poznámky. Po vyplnění dotazníku bude následovat diskuze o tom na jakém základě a jakým způsobem jste se v této situaci rozhodovali.

Dotazník je anonymní. Pro statistické zpracování prosím vyplňte tyto údaje:

Dnešní datum	___ - ___ . 2007
Pohlaví	Muž ☐ Žena ☐
Věk	_____
Dosažené vzdělání	Základní ☐
	Středoškolské ☐
	Vysokoškolské ☐
Zaměstnání	Student ☐
	Jiné: _____

Představte si následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Navíc si uvědomujete, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a kurz cizího jazyka v hodnotě 9 000 Kč. Po úspěšném ukončení tohoto kurzu jste kontaktoval/a společnosti, u kterých jste se zajímal/a o pozici.

Měl/a jste celkem štěstí a z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Tato pozice se Vám zatím líbí víc, slibuje větší plat, ale také zajímavější náplň práce. Nicméně, aby jste mohl/a ve výběrovém řízení uspět musel/a by jste absolvovat jazykový kurz. Pokud by Vás přijali, firma by Vám jej plně uhradila. Kurz se musí platit předem v plné ceně a kursovné se nevrací pokud kurz neabsolvujete.

Na základě těchto informací se rozdohněte zda by jste si zaplatil/a další jazykový kurz.

Ano ☐ Ne ☐

Pokud jste odpověděl/a ano, kolik by jste byl/a ochoten/ochotna za další jazykový kurz maximálně zaplatit?

Které informace byli při Vašem rozhodování nejdůležitější?

Jaké další informace nebo změny v scénáři by musely nastat abyste se rozdl/a jinak?

Poznámky:

Děkuji za vyplnění dotazníku.
Nina Bakošová, studentka 5.ročníku na FF UK v Praze
S Vašimi dotazy mě můžete kontaktovat na nina.bakosova@gmail.com

11.1.2 Phase B

Control group – Zero sunk costs incurred

Následující dotazník je určen ke zkoumání procesu rozhodování jednotlivce. Ráda bych Vás požádala o spontánní a upřímné vyplnění tohoto krátkého dotazníku. V případě, že máte k dotazníku jakékoliv dotazy či připomínky, můžete je zaznamenat v části určené pro poznámky.

Dotazník je anonymní. Pro statistické zpracování prosím vyplňte tyto údaje:

Dnešní datum	___ . ___ . 2007	
Pohlaví	Muž ☐	Žena ☐
Věk	_____	
Dosažené vzdělání	Základní	☐
	Středoškolské	☐
	Vysokoškolské	☐
Zaměstnání	Student	☐
	Jiné: _____	

Představte si následující situaci, zkuste se do ní vžít a pak rozhodněte, jak byste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Navíc si uvědomujete, že na dnešním trhu práce je důležitá znalost cizích jazyků, a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily.

Měl/a jste celkem štěstí a z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovat jazykový kurz. Pokud by Vás přijali, firma by Vám jej plně uhradila. Kurz se musí platit předem v plné ceně a kursovné se nevrací pokud kurz neabsolvujete.

Na základě těchto informací se rozdohněte zda byste si zaplatil/a jazykový kurz.

Ano ☐ Ne ☐

Pokud jste odpověděl/a ano, kolik byste byl/a ochoten/ochotna za jazykový kurz maximálně zaplatit?

Které informace byli při Vašem rozhodování nejdůležitější?

Jaké další informace nebo změny v scénáři by musely nastat abyste se rozdl/a jinak?

Poznámky:

Děkuji za vyplnění dotazníku.
Nina Bakošová, studentka 5.ročníku na FF UK v Praze
S Vašimi dotazy mě můžete kontaktovat na nina.bakosova@gmail.com

Experimental group – Medium sunk costs incurred (9 000 CZK)

Následující dotazník je určen ke zkoumání procesu rozhodování jednotlivce. Ráda bych Vás požádala o spontánní a upřímné vyplnění tohoto krátkého dotazníku. V případě, že máte k dotazníku jakékoliv dotazy či připomínky, můžete je zaznamenat v části určené pro poznámky.

Dotazník je anonymní. Pro statistické zpracování prosím vyplňte tyto údaje:

Dnešní datum	___ . ___ . 2007	
Pohlaví	Muž ☐	Žena ☐
Věk	_____	
Dosažené vzdělání	Základní	☐
	Středoškolské	☐
	Vysokoškolské	☐
Zaměstnání	Student	☐
	Jiné: _____	

Představte si následující situaci, zkuste se do ní vžít a pak rozhodněte, jak byste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Navíc si uvědomujete, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a kurz cizího jazyka v hodnotě 9 000 Kč. Po úspěšném ukončení tohoto kurzu jste kontaktoval/a společnosti, u kterých jste se zajímal/a o pozici.

Měl/a jste celkem štěstí a z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovat jazykový kurz. Pokud by Vás přijali, firma by Vám jej plně uhradila. Kurz se musí platit předem v plné ceně a kursovné se nevrací pokud kurz neabsolvujete.

Na základě těchto informací se rozdohněte zda byste si zaplatil/a další jazykový kurz.

Ano ☐ Ne ☐

Pokud jste odpověděl/a ano, kolik byste byl/a ochoten/ochotna za další jazykový kurz maximálně zaplatit?

Které informace byli při Vašem rozhodování nejdůležitější?

Jaké další informace nebo změny v scénáři by musely nastat abyste se rozdl/a jinak?

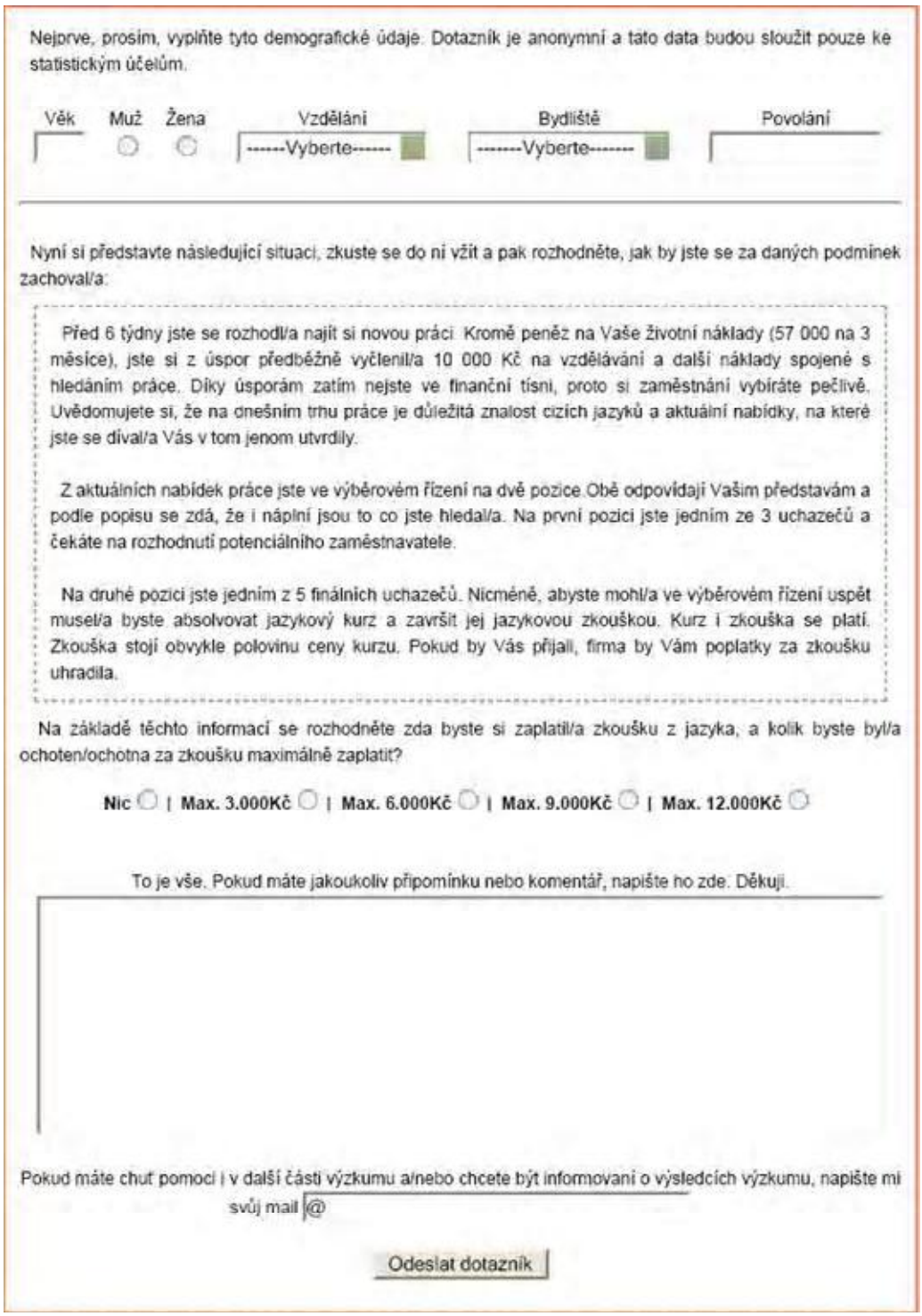
Poznámky:

Děkuji za vyplnění dotazníku.
Nina Bakošová, studentka 5.ročníku na FF UK v Praze
S případnými dotazy mě můžete kontaktovat na nina.bakosova@gmail.com

11.2 Appendix 2

11.2.1 Scenarios with monetary investments

Control group – Zero sunk costs incurred



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě peněz na Vaše životní náklady (57 000 na 3 měsíce), jste si z úspor předběžně vyčlenil/a 10 000 Kč na vzdělávání a další náklady spojené s hledáním práce. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice. Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovat jazykový kurz a završit jej jazykovou zkouškou. Kurz i zkouška se platí. Zkouška stojí obvykle polovinu ceny kurzu. Pokud by Vás přijali, firma by Vám poplatky za zkoušku uhradila.

Na základě těchto informací se rozhodněte zda byste si zaplatil/a zkoušku z jazyka, a kolik byste byl/a ochoten/ochotna za zkoušku maximálně zaplatit?

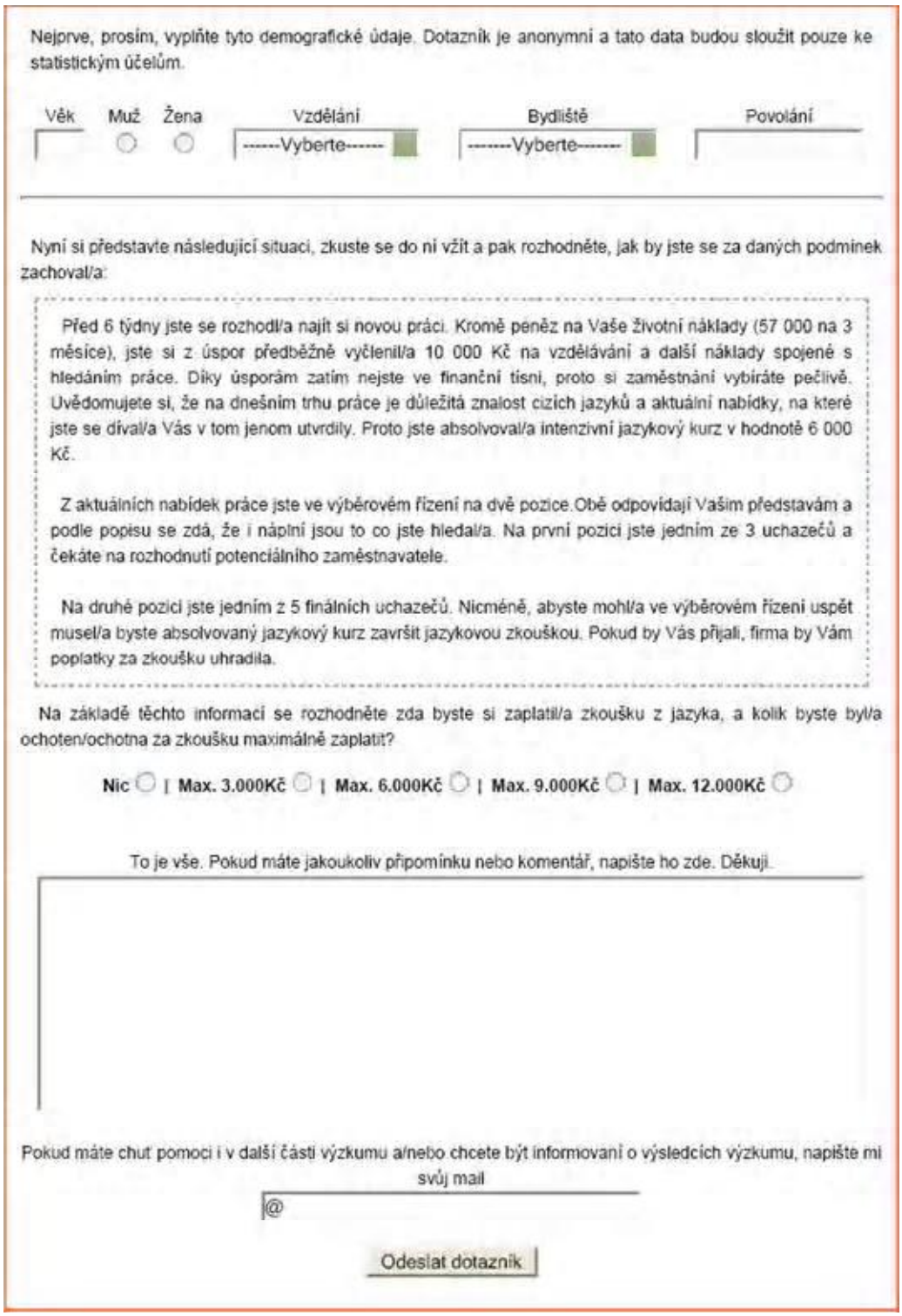
Nic | **Max. 3.000Kč** | **Max. 6.000Kč** | **Max. 9.000Kč** | **Max. 12.000Kč**

To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail @

Odeslat dotazník

Experimental group – Small sunk costs incurred (6 000 CZK)



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě peněz na Vaše životní náklady (57 000 na 3 měsíce), jste si z úspor předběžně vyčlenil/a 10 000 Kč na vzdělávání a další náklady spojené s hledáním práce. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a intenzivní jazykový kurz v hodnotě 6 000 Kč.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovaný jazykový kurz završit jazykovou zkouškou. Pokud by Vás přijali, firma by Vám poplatky za zkoušku uhradila.

Na základě těchto informací se rozhodněte zda byste si zaplatil/a zkoušku z jazyka, a kolik byste byl/a ochoten/ochotna za zkoušku maximálně zaplatit?

Nic | **Max. 3.000Kč** | **Max. 6.000Kč** | **Max. 9.000Kč** | **Max. 12.000Kč**

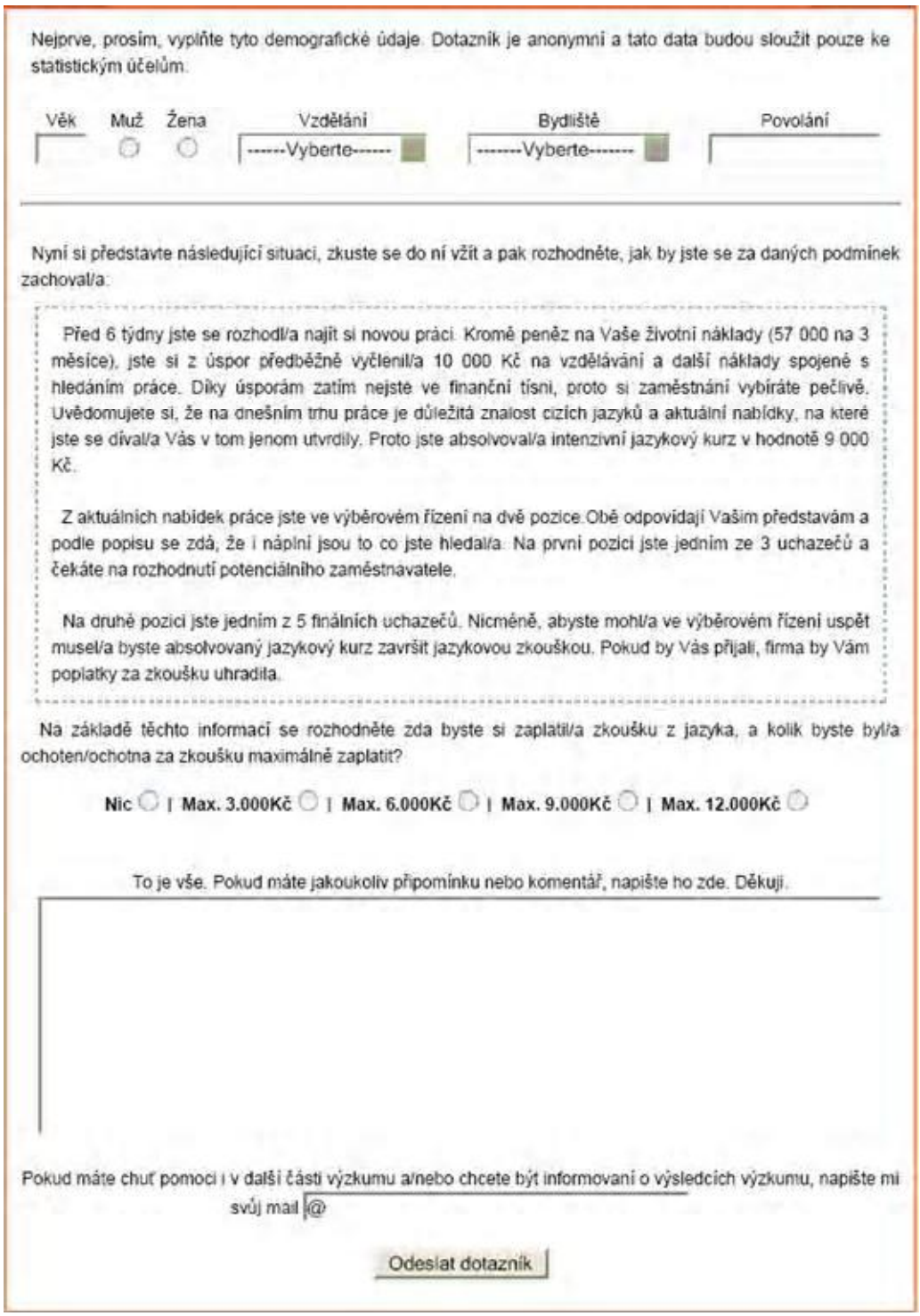
To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail

@

Odeslat dotazník

Experimental group – Medium sunk costs incurred (9 000 CZK)



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě peněz na Vaše životní náklady (57 000 na 3 měsíce), jste si z úspor předběžně vyčlenil/a 10 000 Kč na vzdělávání a další náklady spojené s hledáním práce. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a intenzivní jazykový kurz v hodnotě 9 000 Kč.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice. Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovaný jazykový kurz završit jazykovou zkouškou. Pokud by Vás přijali, firma by Vám poplatky za zkoušku uhradila.

Na základě těchto informací se rozhodněte zda byste si zaplatil/a zkoušku z jazyka, a kolik byste byl/a ochoten/ochotna za zkoušku maximálně zaplatit?

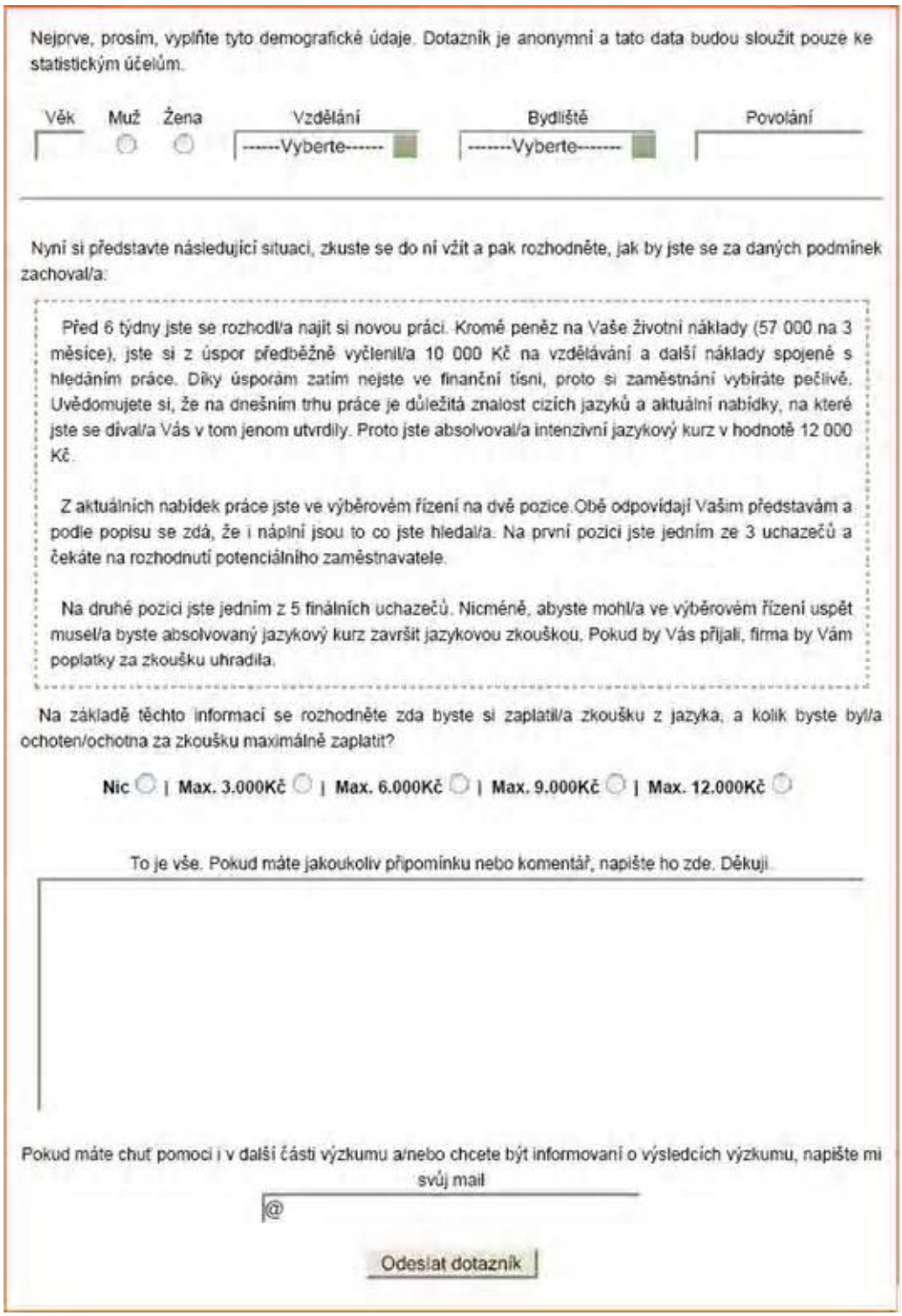
Nic | **Max. 3.000Kč** | **Max. 6.000Kč** | **Max. 9.000Kč** | **Max. 12.000Kč**

To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail @

Odeslat dotazník

Experimental group – Large sunk costs incurred (12 000 CZK)



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě peněz na Vaše životní náklady (57 000 na 3 měsíce), jste si z úspor předběžně vyčlenil/a 10 000 Kč na vzdělávání a další náklady spojené s hledáním práce. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a intenzivní jazykový kurz v hodnotě 12 000 Kč.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovaný jazykový kurz završit jazykovou zkouškou. Pokud by Vás přijali, firma by Vám poplatky za zkoušku uhradila.

Na základě těchto informací se rozhodněte zda byste si zaplatil/a zkoušku z jazyka, a kolik byste byl/a ochoten/ochotna za zkoušku maximálně zaplatit?

Nic | **Max. 3.000Kč** | **Max. 6.000Kč** | **Max. 9.000Kč** | **Max. 12.000Kč**

To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail

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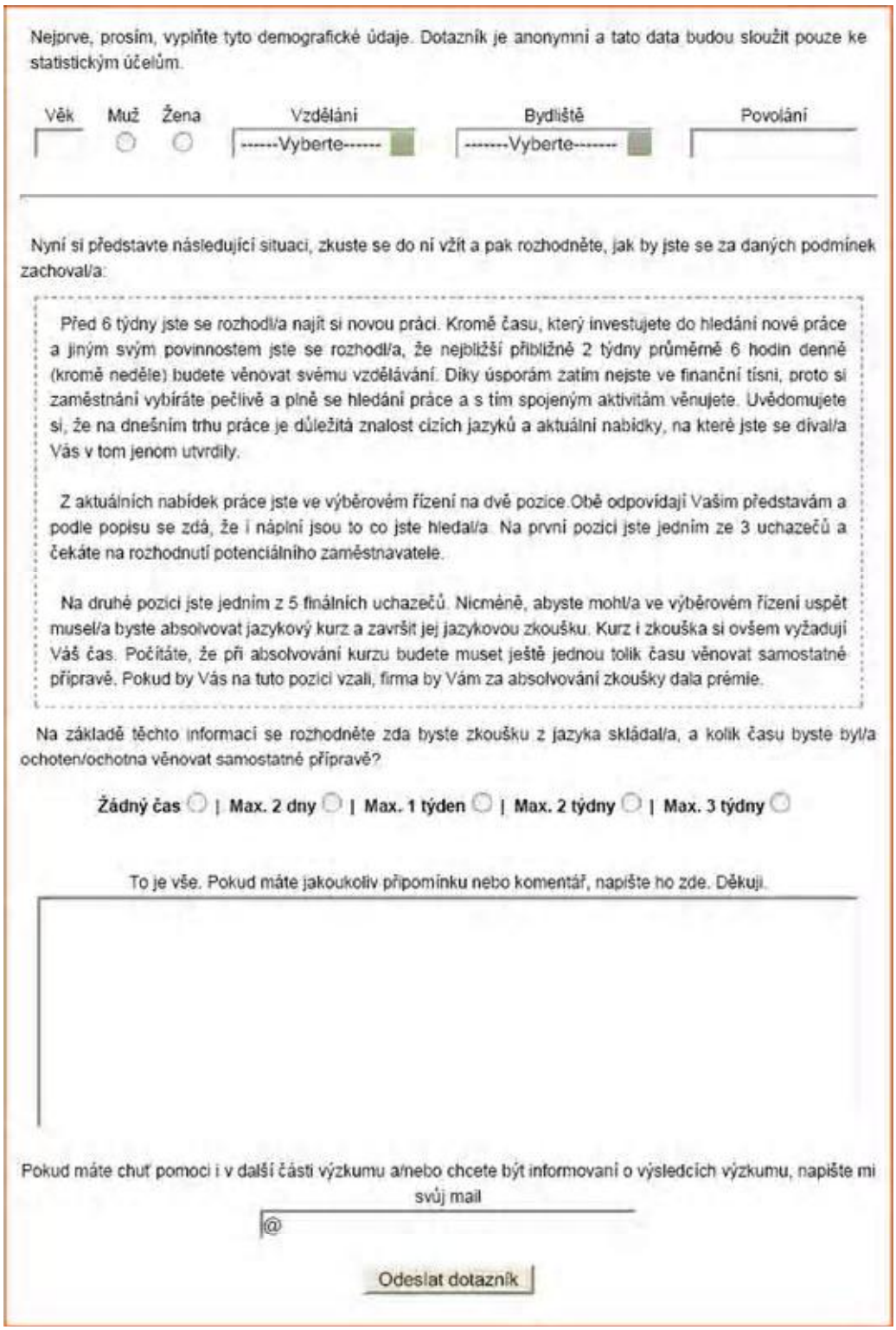
11.2.2 Scenarios with time investments

Control group – Zero sunk costs incurred



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě času, který investujete do hledání nové práce a jiným svým povinnostem jste se rozhodl/a, že nejbližší přibližně 2 týdny průměrně 6 hodin denně (kromě neděle) budete věnovat svému vzdělávání. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě a plně se hledání práce a s tím spojeným aktivitám věnujete. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste moh!/a ve výběrovém řízení uspět musel/a byste absolvovat jazykový kurz a završit jej jazykovou zkoušku. Kurz i zkouška si ovšem vyžadují Váš čas. Počítáte, že při absolvování kurzu budete muset ještě jednou tolik času věnovat samostatné přípravě. Pokud by Vás na tuto pozici vzali, firma by Vám za absolvování zkoušky dala prémie.

Na základě těchto informací se rozhodněte zda byste zkoušku z jazyka skládal/a, a kolik času byste byl/a ochoten/ochotna věnovat samostatné přípravě?

Žádný čas | **Max. 2 dny** | **Max. 1 týden** | **Max. 2 týdny** | **Max. 3 týdny**

To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail

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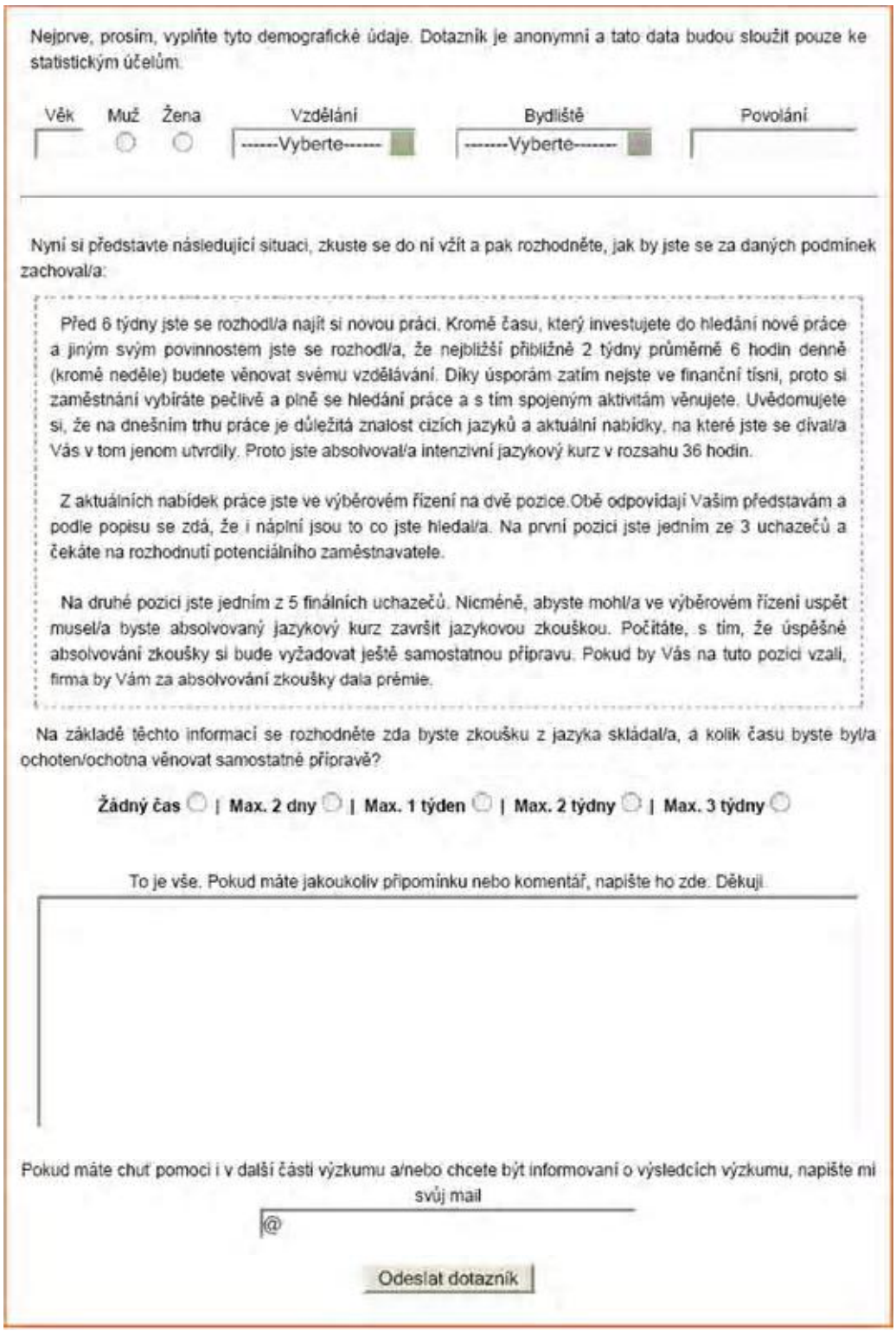
Odeslat dotazník

Experimental group – Small sunk costs incurred (36 hours – 1 week)



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě času, který investujete do hledání nové práce a jiným svým povinnostem jste se rozhodl/a, že nejbližší přibližně 2 týdny průměrně 6 hodin denně (kromě neděle) budete věnovat svému vzdělávání. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě a plně se hledání práce a s tím spojeným aktivitám věnujete. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a intenzivní jazykový kurz v rozsahu 36 hodin.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice. Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovaný jazykový kurz završit jazykovou zkouškou. Počítáte, s tím, že úspěšné absolvování zkoušky si bude vyžadovat ještě samostatnou přípravu. Pokud by Vás na tuto pozici vzali, firma by Vám za absolvování zkoušky dala prémie.

Na základě těchto informací se rozhodněte zda byste zkoušku z jazyka skládal/a, a kolik času byste byl/a ochoten/ochotna věnovat samostatné přípravě?

Žádný čas | **Max. 2 dny** | **Max. 1 týden** | **Max. 2 týdny** | **Max. 3 týdny**

To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail

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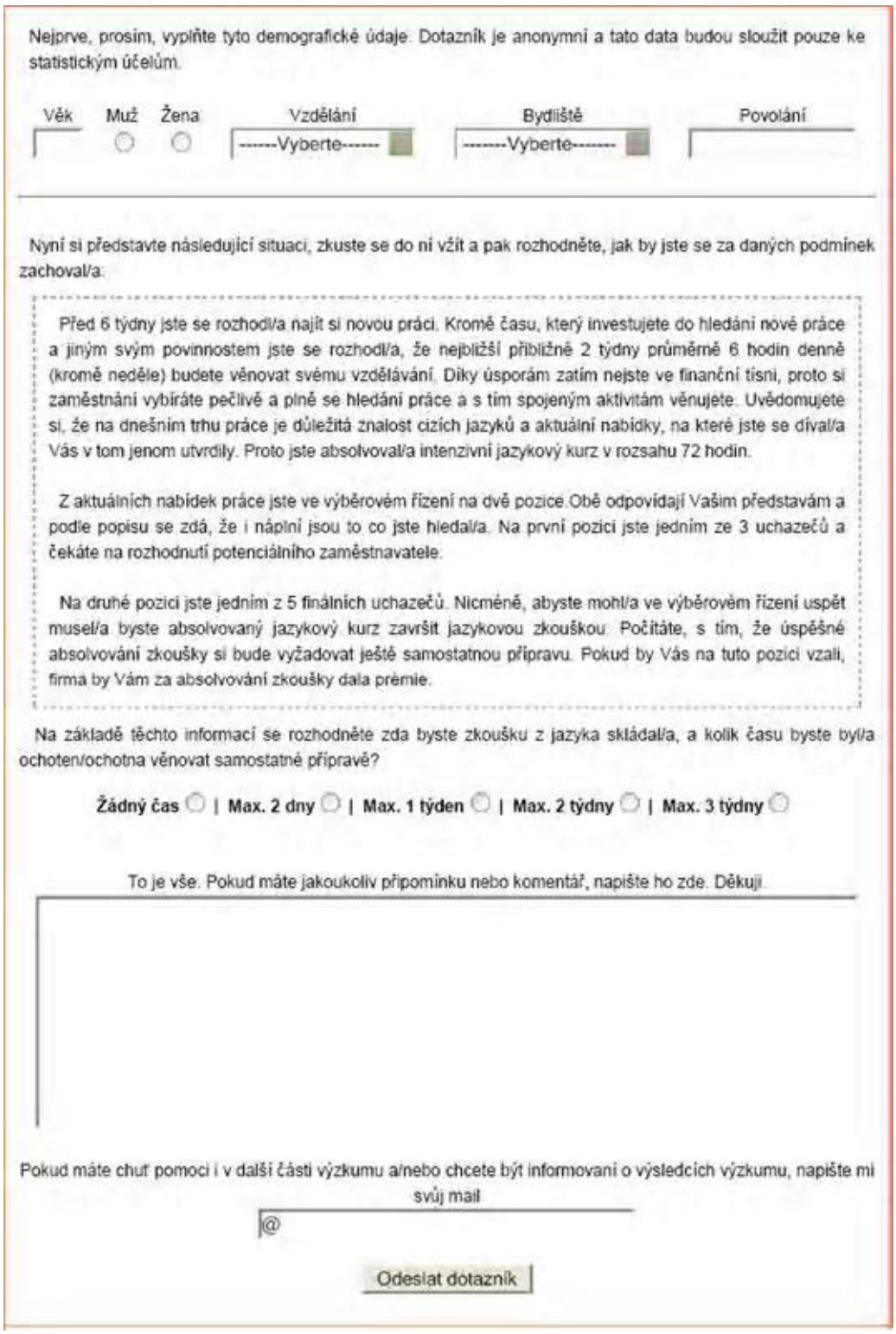
Odeslat dotazník

Experimental group – Medium sunk costs incurred (72 hours – 2 weeks)



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a:

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě času, který investujete do hledání nové práce a jiným svým povinnostem jste se rozhodl/a, že nejbližší přibližně 2 týdny průměrně 6 hodin denně (kromě neděle) budete věnovat svému vzdělávání. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě a plně se hledání práce a s tím spojeným aktivitám věnujete. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a intenzivní jazykový kurz v rozsahu 72 hodin.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovaný jazykový kurz završit jazykovou zkouškou. Počítáte, s tím, že úspěšné absolvování zkoušky si bude vyžadovat ještě samostatnou přípravu. Pokud by Vás na tuto pozici vzali, firma by Vám za absolvování zkoušky dala prémie.

Na základě těchto informací se rozhodněte zda byste zkoušku z jazyka skládal/a, a kolik času byste byl/a ochoten/ochotna věnovat samostatné přípravě?

Žádný čas | **Max. 2 dny** | **Max. 1 týden** | **Max. 2 týdny** | **Max. 3 týdny**

To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail

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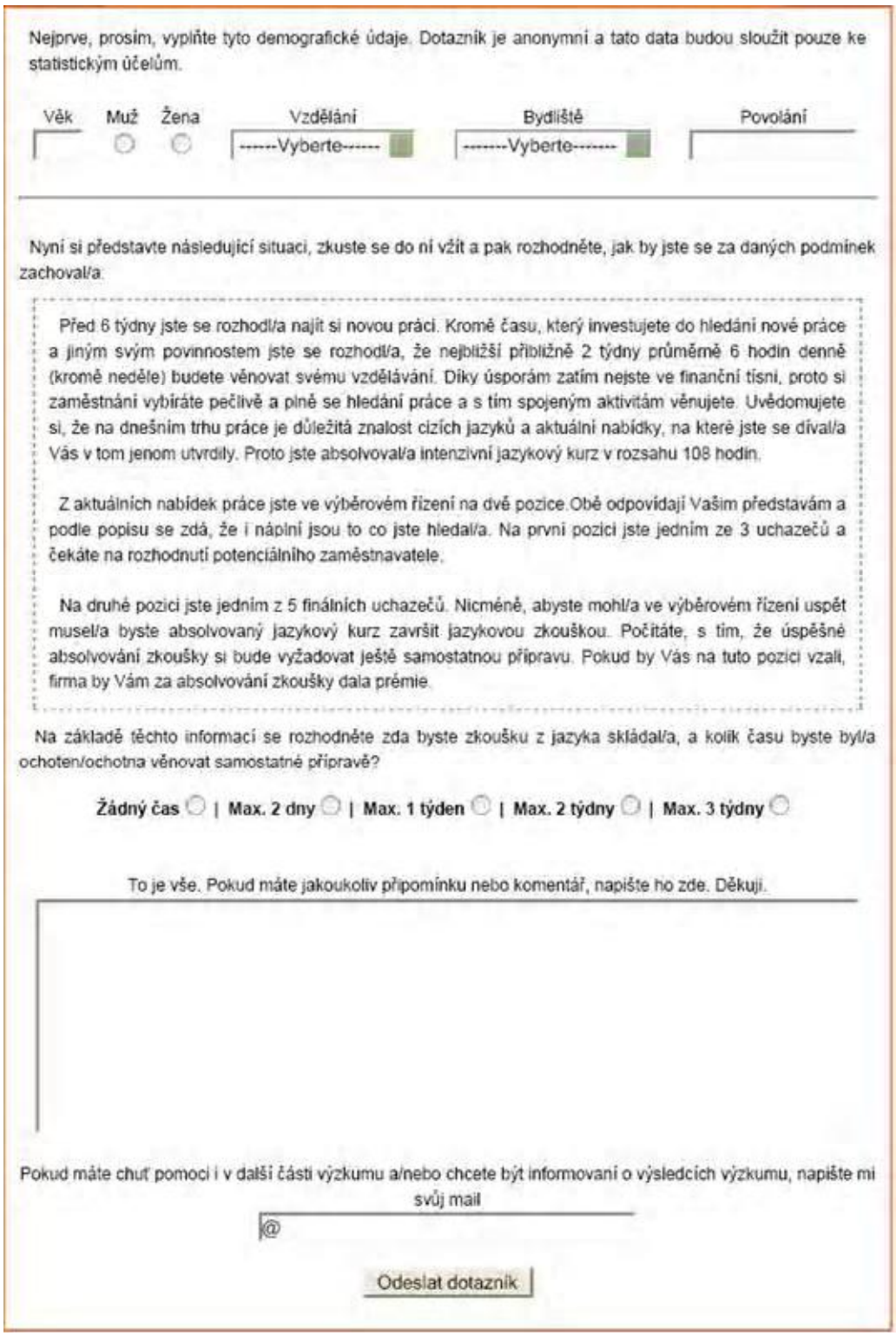
Experimental group – Large sunk costs incurred (108 hours – 3 weeks)



Nejprve, prosím, vyplňte tyto demografické údaje. Dotazník je anonymní a tato data budou sloužit pouze ke statistickým účelům.

Věk | Muž | Žena | Vzdělání: ------Vyberte------ | Bydliště: -------Vyberte------- | Povolání

Nyní si představte následující situaci, zkuste se do ní vžít a pak rozhodněte, jak by jste se za daných podmínek zachoval/a.

Před 6 týdny jste se rozhodl/a najít si novou práci. Kromě času, který investujete do hledání nové práce a jiným svým povinnostem jste se rozhodl/a, že nejbližší přibližně 2 týdny průměrně 6 hodin denně (kromě neděle) budete věnovat svému vzdělávání. Díky úsporám zatím nejste ve finanční tísni, proto si zaměstnání vybíráte pečlivě a plně se hledání práce a s tím spojeným aktivitám věnujete. Uvědomujete si, že na dnešním trhu práce je důležitá znalost cizích jazyků a aktuální nabídky, na které jste se díval/a Vás v tom jenom utvrdily. Proto jste absolvoval/a intenzivní jazykový kurz v rozsahu 108 hodin.

Z aktuálních nabídek práce jste ve výběrovém řízení na dvě pozice.Obě odpovídají Vašim představám a podle popisu se zdá, že i náplní jsou to co jste hledal/a. Na první pozici jste jedním ze 3 uchazečů a čekáte na rozhodnutí potenciálního zaměstnavatele.

Na druhé pozici jste jedním z 5 finálních uchazečů. Nicméně, abyste mohl/a ve výběrovém řízení uspět musel/a byste absolvovaný jazykový kurz završit jazykovou zkouškou. Počítáte, s tím, že úspěšné absolvování zkoušky si bude vyžadovat ještě samostatnou přípravu. Pokud by Vás na tuto pozici vzali, firma by Vám za absolvování zkoušky dala prémie.

Na základě těchto informací se rozhodněte zda byste zkoušku z jazyka skládal/a, a kolik času byste byl/a ochoten/ochotna věnovat samostatné přípravě?

Žádný čas | **Max. 2 dny** | **Max. 1 týden** | **Max. 2 týdny** | **Max. 3 týdny**

To je vše. Pokud máte jakoukoliv připomínku nebo komentář, napište ho zde. Děkuji.

Pokud máte chuť pomoci i v další části výzkumu a/nebo chcete být informováni o výsledcích výzkumu, napište mi svůj mail

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11.3 Appendix 3

11.3.1 Introductory page

11.3.2 Final page

11.4 Appendix 4

11.4.1 Statistics in Pilot Study Phase A

Table 17: Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,146(b)	1	,702		
Continuity Correction(a)	,000	1	1,000		
Likelihood Ratio	,149	1	,699		
Fisher's Exact Test				1,000	,596
Linear-by-Linear Association	,141	1	,707		
N of Valid Cases	32				

a Computed only for a 2x2 table
b 2 cells (50,0%) have expected count less than 5. The minimum expected count is 1,31.

Table 18: Independent Samples T-Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	,574	,455	-,299	28	,767	-597.222	1,999.513	-4,693.038	3,498.594
Equal variances not assumed			-,284	19,611	,780	-597.222	2,104.052	-4,991.780	3,797.336

11.4.2 Statistics in Pilot Study Phase B

Table 19: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,884(b)	1	,049		
Continuity Correction(a)	2,313	1	,128		
Likelihood Ratio	4,019	1	,045		
Fisher's Exact Test				,080	,063
Linear-by-Linear Association	3,699	1	,054		
N of Valid Cases	21				

a Computed only for a 2x2 table
b 2 cells (50,0%) have expected count less than 5. The minimum expected count is 3,81.

Table 20: Independent Samples T-Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	9,540	,007	-3,387	16	,004	-9000	2657,391	-14633,418	-3366,582
Equal variances not assumed			-3,387	9,658	,007	-9000	2657,391	-14949,556	-3050,444

11.4.3 Statistics in Main Study – monetary investments

Table 21: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6,207(a)	12	,905
Likelihood Ratio	6,308	12	,900
Linear-by-Linear Association	,339	1	,560
N of Valid Cases	192		

(a) 4 cells (20,0%) have expected count less than 5. The minimum expected count is 3,18.

Table 22: Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
,305	3	188	,822

Table 23: One-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1665863,819	3	555287,940	,068	,977
Within Groups	1540662261,181	188	8195012,028		
Total	1542328125,000	191			

Table 24: Pearson correlation

		Scenario	Money
Scenario	Pearson Correlation	1	,014
	Sig. (2-tailed)	.	,848
	Sum of Squares and Cross-products	23995,313	84843,750
	Covariance	125,630	444,208
	N	192	192
Money	Pearson Correlation	,014	1
	Sig. (2-tailed)	,848	.
	Sum of Squares and Cross-products	84843,750	1542328125,000
	Covariance	444,208	8075016,361
	N	192	192

Table 25: Spearman correlation

			Scenario	Money
Spearman's rho	Scenario	Correlation Coefficient	1,000	,013
		Sig. (2-tailed)	.	,863
		N	192	192
	Money	Correlation Coefficient	,013	1,000
		Sig. (2-tailed)	,863	.
		N	192	192

11.4.4 Statistics in Main Study – time investments

Table 26: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17,160(a)	12	,144
Likelihood Ratio	16,823	12	,156
Linear-by-Linear Association	2,943	1	,086
N of Valid Cases	196		

(a) 8 cells (40,0%) have expected count less than 5. The minimum expected count is 1,92.

Table 27: Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3,607	3	192	,014

Table 28: Pearson's correlation

		Scenario	Time
Scenario	Pearson Correlation	1	-,125(*)
	Sig. (1-tailed)	.	,040
	N	196	196
Time	Pearson Correlation	-,125(*)	1
	Sig. (1-tailed)	,040	.
	N	196	196

* Correlation is significant at the 0.05 level (1-tailed).

Table 29: Spearman's correlation

			Scenario	Time
Spearman's rho	Scenario	Correlation Coefficient	1,000	-,124(*)
		Sig. (1-tailed)	.	,041
		N	196	196
	Time	Correlation Coefficient	-,124(*)	1,000
		Sig. (1-tailed)	,041	.
		N	196	196

* Correlation is significant at the 0.05 level (1-tailed).

Table 30: Independent Samples T-Tests for each pair of research groups

			Levene's Test for Equality of Variances		t-test for Equality of Means						
			F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper
Pair	Zero – Small time costs	Equal variances assumed	9.604	**.003**	1.527	97	.130	11.050	7.237	-3.315	25.414
		Equal variances not assumed			1.530	93.402	.129	11.050	7.222	-3.290	25.389
	Zero – Medium time costs	Equal variances assumed	3.522	.064	.772	94	.442	5.341	6.917	-8.393	19.075
		Equal variances not assumed			.770	91.631	.443	5.341	6.934	-8.432	19.114
	Zero – Large time costs	Equal variances assumed	2.592	.111	2.258	97	**.026**	15.130	6.701	1.831	28.429
		Equal variances not assumed			2.260	96.573	.026	15.130	6.695	1.842	28.418
	Small – Medium time costs	Equal variances assumed	1.681	.198	-.742	95	.460	-5.709	7.696	-20.987	9.569
		Equal variances not assumed			-.744	94.867	.459	-5.709	7.672	-20.940	9.522
	Small – Large time costs	Equal variances assumed	2.821	.096	.547	98	.585	4.080	7.456	-10.716	18.876
		Equal variances not assumed			.547	96.326	.586	4.080	7.456	-10.720	18.880
	Medium – Large time costs	Equal variances assumed	.119	.731	1.365	95	.175	9.789	7.171	-4.447	24.025
		Equal variances not assumed			1.364	94.151	.176	9.789	7.178	-4.463	24.041

12 References

ANSCOMBE, F.J. Some Remarks on Bayesian Statistics. In SHELLY, M.W. II, BRYAN, G.L. *Human judgments and optimality.* [s.l.] : John Wiley & Sons, Inc., 1964. s. 3-36.

ARKES, H.R., BLUMER, C. The psychology of sunk cost. *Organizational Behavior and Human Decision Processes*, 1985, vol. 35, s. 124-40.

ARMOR, D.A., TAYLOR, S.E. When Predictions Fail: The Dilemma of Unrealistic Optimism. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 334-347. ISBN 0-521-53101-2.

BACCINI, A. High pressure and black clouds: Keynes and the frequentist theory of probability. *Cambridge Journal of Economics*, 2004, vol. 28, s. 653-666.

BAIRD, D.G., MORRISON, E.R. Bankruptcy Decision Making. *The Journal of Law, Economics, and Organization*, 2001, vol. 17, is. 2, s. 356-372.

BARNARD, C.I. Decisions and organizations. 1938. In CASTLES, F.G., MURRAY, D.J., POTTER, D.C. *Decisions, organizations and society.* Middlesex: Penguin Books Ltd., 1971. s. 31-36.

BORNSTEIN, B.H., CHAPMAN, G.B. Learning Lessons From Sunk Costs. *Journal of Experimental Psychology: Applied*, 1995, vol. 1, no. 4, s. 251-269.

BRICHCÍN, M. *Vůle a sebekontrola : teorie, metody, experimenty*. 1. vyd. Praha : Karolinum, 1999. 422 s. ISBN 80-7184-753-4.

BUEHLER, R., GRIFFIN, D., ROSS, M. Inside the Planning Fallacy: The Causes and Consequences of Optimistic Time Predictions. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 250-270. ISBN 0-521-53101-2.

CASTLES, F.G., MURRAY, D.J., POTTER, D.C. Decisions, organizations and society. Middlesex : Penguin Books Ltd., 1971. 424 s.

CHAPMAN, G.B., JOHNSON, E.J. Incorporating the Irrelevant: Anchors in Judgments of Belief and Value. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 120-138. ISBN 0-521-53101-2.

CHURCHMAN, W.C., EISENBERG, H.B. Deliberation and Judgment. In SHELLY, M.W. II, BRYAN, G.L. *Human judgments and optimality.* [s.l.]: John Wiley & Sons, Inc., 1964. s. 45-55.

DE BONDT, W.F.M., THALER, R.H. *Financial Decision-Making in Markets and Firms: Behavioral Perspective* [online], 1994 [cit. 2007-01-03]. Dostupný z WWW: <http://www.nber.org/papers/w4777>.

DE BONDT, W.F.M., THALER, R.H. Do Analysts Overreact? In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 678-685. ISBN 0-521-53101-2.

DIXIT, A. Entry and Exit Decisions under Uncertainty. *The Journal of Political Economy*, 1989, vol. 97, no. 3, s. 620-638.

ETZIONI, A. *Morální dimenze ekonomiky.* Praha: Victoria Publishing, 1995. 243 s. ISBN 80-85865-19-X.

FERJENČÍK, J. *Úvod do metodologie psychologického výzkumu: jak zkoumat lidskou duši.* 1. vyd. Praha: Portál, 2000. 255 s. ISBN 8071783676.

FISHBURN, P.C. *Utility theory of decision making.* [s.l.]: John Wiley & Sons, Inc., 1970. 234 s.

GARLAND, H. Throwing Good Money After Bad: The Effect of Sunk Costs on the Decision to Escalate Commitment to an Ongoing Project. *Journal of Applied Psychology*, 1990, vol. 75, no. 6, s. 728-731.

GARLAND, H., CONLON, D. E. Too close to quit: The role of project completion in maintaining commitment. *Journal of Applied Social Psychology*, 1998, vol. 28, s. 2025-2048.

GARLAND, H., NEWPORT, S. Effects of absolute and relative sunk costs on the decision to persist with a course of action. *Organizational Behavior and Human Decision Processes*, 1991, vol. 48, s. 55.69.

GARLAND, H., SANDEFUR, C.A., ROGERS, A.C. De-Escalation of Commitment in Oil Exploration: When Sunk Costs and Negative Feedback Coincide. *Journal of Applied Psychology*, 1990, vol. 75, no. 6, s. 721-727.

GIGERENZER, G. I Think, Therefore I Err. *Social Research* [online]. 2005, vol. 72, no. 1 [cit. 2007-01-03], s. 1-24. Dostupný z WWW: <http://www.mpib-berlin.mpg.de/en/institut/dok/full/gg/ithinkth/ithinkth.pdf>.

GIGERENZER, G., EDWARDS, A. Simple tools for understanding risks : from innumeracy to insight. *BMJ* [online], 2003, vol. 327 [cit. 2007-01-03], s. 741-744. Dostupný z WWW: <http://www.bmj.com/cgi/reprint/327/7417/741?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=gigerenzer&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>.

GIGERENZER, G., GOLDSTEIN, D.G. Reasoning the Fast and Frugal Way : Models of Bounded Rationality. *Psychological Review*, 1996, vol. 103, no. 4 [cit. 2007-04-13], s. 650-669.

GIGERENZER, G., GOLDSTEIN, D.G. Betting on One Good Reason: Take The Best and Its Alternatives. In GIGERENZER, G., TODD, P.M., ABC, Research Group. *Simple Heuristics That Make Us Smart*. [s.l.]: [s.n.], 1999. s. 75-96. ISBN 0-19-512156-2.

GIGERENZER, G., TODD, P.M., ABC, Research Group. *Simple Heuristics That Make Us Smart*. [s.l.]: [s.n.], 1999. s. 75-96. ISBN 0-19-512156-2.

GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment.* Cambridge: Cambridge University Press, 2003. 855 s. ISBN 0 521 79679 2.

GILOVICH, T., GRIFFIN, D. Introduction - Heuristics and Biases: Then and Now. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 1-18. ISBN 0-521-53101-2.

GOLDSTEIN, D.G., GIGERENZER, G. Models of Ecological Rationality: The Recognition Heuristic. *Psychological Review*, 2002, vol. 109, no. 1, s. 75-90.

GRIFFIN, D., TVERSKY, A. The Weighing of Evidence and the Determinants of Confidence. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 230-249. ISBN 0-521-53101-2.

GROS, I. *Kvantitativní metody v manažerském rozhodování*. 1. vyd. Praha : Grada Publishing, 2003. 432 s. ISBN 80-247-0421-8.

HANNIG, U. *Knowledge Management und Business Intelligence*. [s.l.]: Springer-Verlag, 2002. s. 55-62. ISBN 3-540-42804-6.

HANNIG, U. Knowledge Management + Business Intelligence = Decision Intelligence. In HANNIG, U. *Knowledge Management und Business Intelligence*. [s.l.]: Springer-Verlag, 2002. s. 55-62. ISBN 3-540-42804-6.

HANNIG, U., ZWERGER, G. Der Nutzen von Knowledge Management. In HANNIG, U. *Knowledge Management und Business Intelligence*. [s.l.]: Springer-Verlag, 2002. s. 55-62. ISBN 3-540-42804-6.

HEATH, C. Escalation and *De*-escalation of Commitment in Response to Sunk Costs: The Role of Budgeting in Mental Accounting. *Organizational Behavior and Human Decision Processes*, 1995, vol. 62, s. 38-54.

HOLYOAK, K.J., MORRISON, R.G. *The Cambridge Handbook of Thinking and Reasoning*. New York: Cambridge University Press, 2005. ISBN 0-521-53101-2.

HORN, J.T., LOVALLO, D.P., VIGUERIE, P.S. Learning to let go: Making better exit decisions. *The McKinsey Quarterly*, 2006, no. 2, s. 65-75.

ISEN, A.M. Positive Affect and Decision Making. In LEWIS, M., HAVILAND, J.M. *Handbook of Emotions*. New York: The Guildford Press, 1993. s. 261-278. ISBN 0-89862-988-8.

JANIS, I.L., MANN, L. *Decision making: a psychological analysis of conflict, choice, and commitment*. New York, London: The Free Press, 1977. 488 s. ISBN 0-02-916160-6.

JOHNSTONE, D. *The "Reverse" Sunk Cost Effect and Explanations: Rational and Irrational* [online]. 2000 [cit. 2007-05-12]. Dostupný z WWW: <http://www.departments.bucknell.edu/management/apfa/Dundee%20Papers/17Johnstone.pdf>.

JONES, G.T. *Simulation and Business Decisions.* Middlesex : Penguin Books Ltd., 1972. 172 s.

KAHNEMAN, D. *Maps of Bounded Rationality: A Perspective on Intuitive Judgment and Choice* [online]. 2002 [cit. 2007-01-03]. Dostupný z WWW: <http://nobelprize.org/nobel_prizes/economics/laureates/2002/kahnemann-lecture.pdf>.

KAHNEMAN, D., FREDERICK, S. A Model of Heuristic Judgment. In HOLYOAK, K.J., MORRISON, R.G. *The Cambridge Handbook of Thinking and Reasoning*. New York: Cambridge University Press, 2005. s. 267-294. ISBN 0-521-53101-2.

KAHNEMAN, D., KNETSCH, J.L., THALER, R.H. Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *The Journal of Economic Perspectives*, 1991, vol. 5, no. 1, s. 193-206.

KAHNEMAN, D., TVERSKY, A. Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 1979, vol. 47, no. 2, s. 263-292.

KOEHLER, D.J., BRENNER, L., GRIFFIN, D. The Calibration of Expert Judgment: Heuristics and Biases Beyond the Laboratory. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 686-715. ISBN 0-521-53101-2.

LABOEUF, R.A., SHAFIR, E.B. Decision Making. In HOLYOAK, K.J., MORRISON, R.G. *The Cambridge Handbook of Thinking and Reasoning*. New York: Cambridge University Press, 2005. s. 243-266. ISBN 0-521-53101-2.

LAKOFF, G. *Ženy, oheň a nebezpečné věci : Co kategorie vypovídají o naší mysli.* Praha : Triáda, 2006. 656 s. ISBN 80-86138-78-X.

LAKOFF, G., JOHNSON, M. *Metafory, kterými žijeme.* Brno : Host, 2002. 282 s. ISBN 80-7294-071-6

LOEWENSTEIN, G., THALER, R.H. Anomalies: Intertemporal Choice. *The Journal of Economic Perspectives*, 1989, vol. 3, no. 4, s. 181-193.

LOVALLO, D., KAHNEMAN, D. Delusions of Success: How Optimism Undermines Executives' Decisions. *Harvard Business Review*, 2003, vol. 81, no. 7.

MAŇAS, M. *Teorie her a optimální rozhodování*. Praha : Státní nakladatelství technické literatury, 1974. 255 s.

MCCAIN, B.E. Continuing Investment Under Conditions of Failure: A Laboratory Study of the Limits to Escalation. *Journal of Applied Psychology*, 1986, vol. 71, no. 2, s. 280-284.

MCGRAW, K.O., TEW, M.D., WILLIAMS, J.E. The integrity of web-delivered experiments: Can you trust the data? *Psychological Science*, 2000, vol. 11, s. 502-506.

MOON, H. Looking Forward and Looking Back: Integrating Completion and Sunk-Cost Effects Within an Escalation-of-Commitment Progress Decision. *Journal of Applied Psychology*, 2001, vol. 86, no. 1, s. 104-113.

MULLAINATHAN, S., THALER, R.H. *Behavioral Economics* [online]. 2000 [cit. 2007-01-03]. Dostupný z WWW: <http://www.nber.org/papers/w7948>.

MURRAY, F.Z. An Intertemporal Model of Industrial Exit. *The Quarterly Journal of Economics*. 1988, vol. 103, no. 2, s. 333-344.

OLSON, M. Groups and organizations and their basis of support. 1965. In CASTLES, F.G., MURRAY, D.J., POTTER, D.C. *Decisions, organizations and society.* Middlesex: Penguin Books Ltd., 1971. s. 154-165.

RABIN, M., THALER, R.H. Anomalies: Risk Aversion. *The Journal of Economic Perspectives*, 2001, vol. 15, no. 1, s. 219-232.

ROXBURGH, C. Hidden flaws in strategy. *The McKinsey Quarterly*. 2003, no. 2.

SCOTT, W.G. Decisions concepts. 1967. In CASTLES, F.G., MURRAY, D.J., POTTER, D.C. *Decisions, organizations and society.* Middlesex: Penguin Books Ltd., 1971. s. 19-27.

SHELLY, M.W. II, BRYAN, G.L. Human judgments and optimality. [s.l.]: John Wiley & Sons, Inc., 1964. 436 s.

SHELLY, M.W. II, BRYAN, G.L. Judgments and the Language of Decisions. In SHELLY, M.W. II, BRYAN, G.L. *Human judgments and optimality.* [s.l.]: John Wiley & Sons, Inc., 1964. s. 3-36.

SHEPARD, R.N. On subjectively optimum selection among multiattribute alternatives. In SHELLY, M.W. II, BRYAN, G.L. *Human judgments and optimality.* [s.l.]: John Wiley & Sons, Inc., 1964. s. 257-281.

SCHARY, M.A. The Probability of Exit. *The RAND Journal of Economics*, 1991, vol. 22, no. 3, s. 339-353.

SCHWARZ, N., VAUGHN, L.A. The Availability Heuristic Revisited: Ease of Recall and Content of Recall as Distinct Sources of Information. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases : The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 103-119. ISBN 0-521-53101-2.

SIMON, H.A. Theories of decision making in economics and behavioural science. 1959. In CASTLES, F.G., MURRAY, D.J., POTTER, D.C. *Decisions, organizations and society.* Middlesex: Penguin Books Ltd., 1971. s. 37-55.

SIMON, H.A. *The sciences of the artificial*. [s.l.]: MIT Press, 1969. 123 s. ISBN 0-262-69023-3.

SKOŘEPA, M. Psychologie proniká do ekonomie. *Vesmír*. 2002, roč. 81, č. 4, s. 212-215. Dostupný z WWW: <http://www.vesmir.cz/clanek.php3?CID=2155>.

SKOŘEPA, M. *Rozhodování jednotlivce : Teorie a skutečnost.* Praha : Karolinum, 2005. 155 s. ISBN 80-246-0960-6.

SKOŘEPA, M. *Zpochybnění deskriptivnosti teorie očekávaného užitku [online]*. 2006 [cit. 2007-06-11]. Dostupný z WWW: <http://ies.fsv.cuni.cz/storage/publication/712_wp2006_7_skorepa.pdf>.

SOKOL, J. *Malá filosofie člověka a slovník filosofických pojmů*. Praha: [s.n.], 1996. 251 s.

STERNBERG, R.J. *Kognitivní psychologie.* Praha: Portál, 2002. 632 s. ISBN 80-7178-376-5.

THAGARD, P. *Úvod do kognitivní vědy : Mysl a myšlení*. Praha : Portál, 2001. 232 s. ISBN 80-7178-445-1.

TVERSKY, A., THALER, R.H. Anomalies: Preference Reversals. *The Journal of Economic Perspectives*, 1990, vol. 4, no. 2, s. 201-211.

UHLÁŘ, P. *Rozhodovací procesy při organizování spolupráce osob v malé skupině*. [s.l.], 1984. 125 s. Univerzita Karlova (Praha). Filozofická fakulta. Katedra psychologie. Vedoucí diplomové práce Milan Brichcín.

UHLÁŘ, P. Psychologie rozhodování : historie a východiska. *Psychologie v Ekonomické Praxi*, 2006, roč. XLI, č. 1-2, s. 1-7.

VROOM, V.H., YETTON, P.W. *Leadership and decision-making*. [s.l.]: University of Pittsburgh Press, 1973. 233 s. ISBN 0-8229-3266-0.

WAKKER, P.P., THALER, R.H., TVERSKY, A. Probabilistic Insurance. *Journal of Risk and Uncertainty*, 1997, vol. 15, is. 1, s. 7-28.

WEINSTEIN, N.D., KLEIN, W.M. Resistance of Personal Risk Perceptions to Debiasing Interventions. In GILOVICH, T., GRIFFIN, D., KAHNEMAN, D. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge: Cambridge University Press, 2002. s. 313-323. ISBN 0-521-53101-2.

Wikipedia: the free encyclopedia [online]. 2007 a) [cit. 2007-05-12]. Dostupný z WWW: <http://en.wikipedia.org/wiki/Endowment_effect>.

Wikipedia: the free encyclopedia [online]. 2007 b) [cit. 2007-05-12]. Dostupný z WWW: <http://en.wikipedia.org/wiki/Indifference_curve>.

Wikipedia: the free encyclopedia [online]. 2007 c) [cit. 2007-05-12]. Dostupný z WWW: <http://en.wikipedia.org/wiki/Discounted_cash_flow>.

Wikipedia: the free encyclopedia [online]. 2007 d) [cit. 2007-03-30]. Dostupný z WWW: <http://en.wikipedia.org/wiki/Zeigarnik_effect>.

WISNIEWSKI, M. *Metody manažerského rozhodování*. Praha : Grada Publishing, 1996. 507 s. ISBN 80-7169-089-9.

WONG, K.F.E., KWONG, J.Y.Y. The Role of Anticipated Regret in Escalation of Commitment. *Journal of Applied Psychology*, 2007, vol. 92, no. 2, s. 545-554.